Wireless Access Point 300

802.11n Wireless with 4 Port 10/100 Switch

User Manual

HNW300APN

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1. Introduction

The Hamlet HNW300APN is a 300Mbit Wireless Access Point based on IEEE 802.11n Wi-Fi standard with a built in 4-port fast Ethernet Switch. It offers the easiest way to share and extend your high-speed DSL/Cable Modem Internet connection, either with or without wires. Network Address Translation (NAT) and VPN pass-through provide your network protection from hackers, while WEP and WPA encryption guard your wireless network for maximum privacy.

1.1 System Requirements

- A computer with pre-installed ethernet adapter
- Pentium 200MHz processor or above
- Windows 98SE / Windows Me / Windows 2000 / Windows XP / Windows Vista and Windows 7
- 64MB of RAM or above
- 25MB free disk space

1.2 Package Contents

- 802.11n Wireless Access Point
- CD-ROM (Software & Manual)
- Quick Installation Guide
- Ethernet Cable (RJ-45)
- Power Adaptor

2. Specification

2.1 LED Meaning

The Access Point has indicator lights on the front side. Please see below for an explanation of the function of each indicator light.

Power indicator

WPS Active indicator

WAN Active indicator

Ethernet Active indicator

Wireless Active indicator

Table 1. LED function

Label	Color	On	Flash	Off
Power	Green	Ready	Waiting for device ready	Power Off
WAN	Green	The device has a WAN IP address from xDSL/Cable Modem	Transmit / Receive Data	No WAN IP address from xDSL/Cable Modem
WLAN	Green	WLAN Ready	Transmit / Receive Data	WLAN Off
WPS	Green	N/A	Start WPS peer within 2 minutes	WPS Idle
1	Green	Ethernet Connected	Transmit / Receive Data	Ethernet Disconnected

2.2 Connectors

The below table shows the function of each connector and switch of the device.

CONNECTOR	DESCRIPTION
ANTENNA	ANTENNA
ON/OFF SWITCH	Power on/off the device
POWER	Connects to the supplied power cable
LAN 4/3/2/1	Connects the device via Ethernet to up to four PCs on your LAN
WAN	Connects the device via Ethernet to xDSL / Cable Modem
WLAN	Press this button for at least two full second to turn off/on wireless signals
WPS	Press this button for at least three full seconds and the WPS LED will flash to start WPS.

Figure1. Rear View of the Wireless ADSL2+ Router

Figure2. WPS and WLAN button

Figure3. RESET button

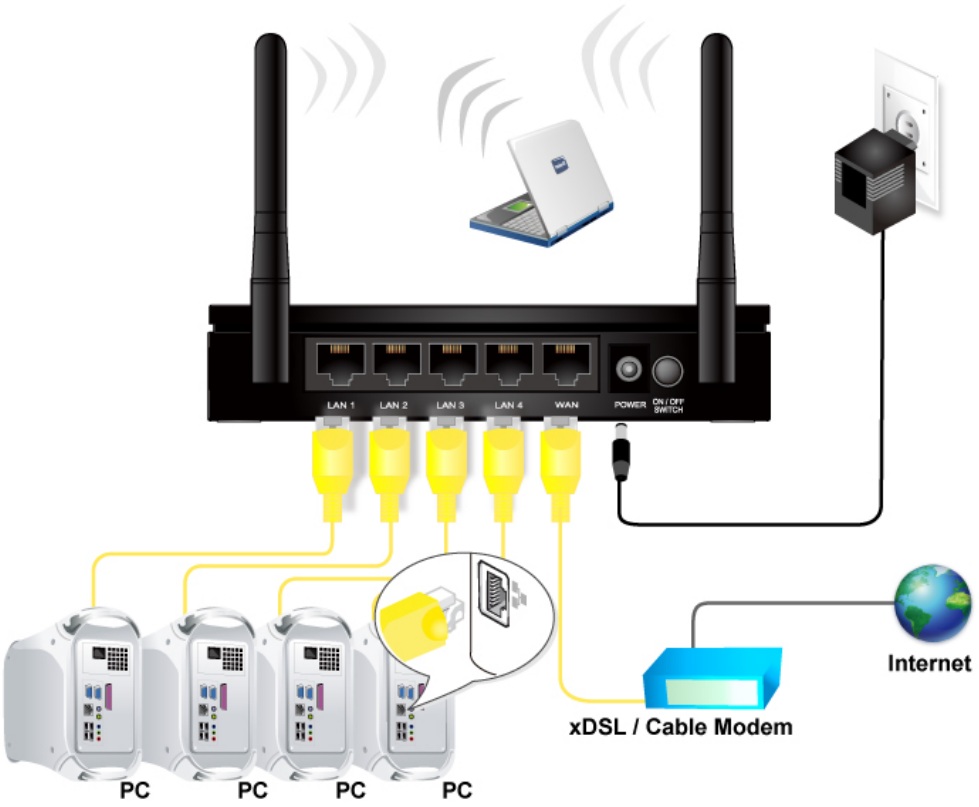
3. Installation & Setup

Follow each step carefully and only go to the next step once you have completed the previous one.

Note: *Be sure that you are well insulated from any power source to avoid electricity shock.*
Note: *Use only the manufacturer-approved power supply that shipped with the Access point.*

1. Connect the power to the Access Point by plugging the power supply into an appropriate electrical outlet.
2. If the Power LED is off, refer to “Troubleshooting” for information.

3.1 Connection of Access Point



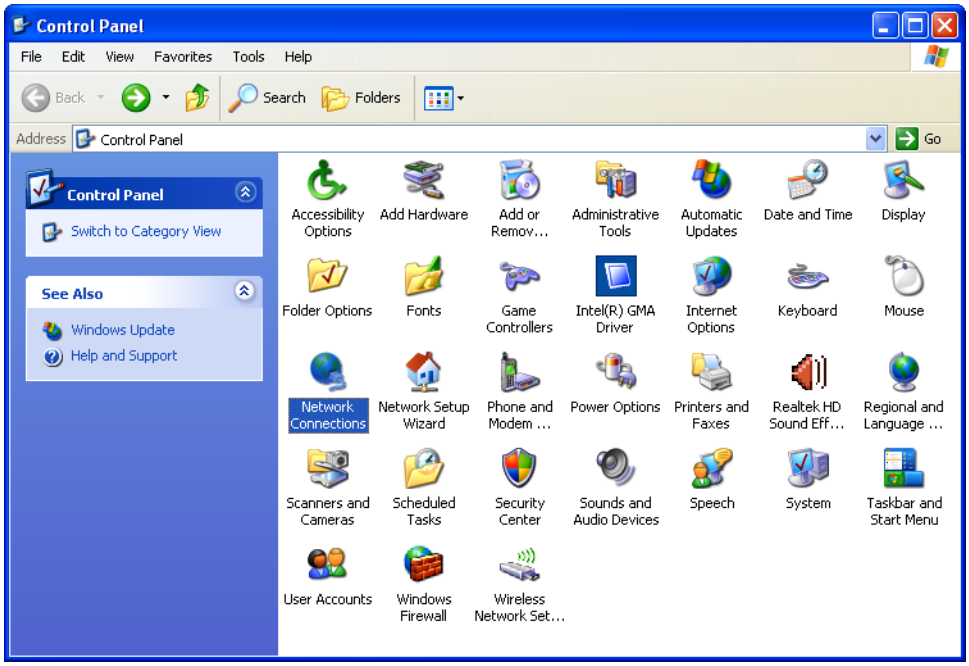
1. Connect the supplied RJ45 Ethernet cable from your PC's Ethernet port to any of the 4 802.11n Wireless Access Point's WAN Ports.
2. Connect the supplied RJ45 Ethernet cable from your xDSL/Cable Modem's Ethernet port to 802.11n Access Point's WAN Port.
3. Connect the power adapter to the power inlet “**Power**” of the 802.11n Access Point and turn the power switch “**ON/OFF Switch**” of your 802.11n Access Point on.

4. Configuration Procedures

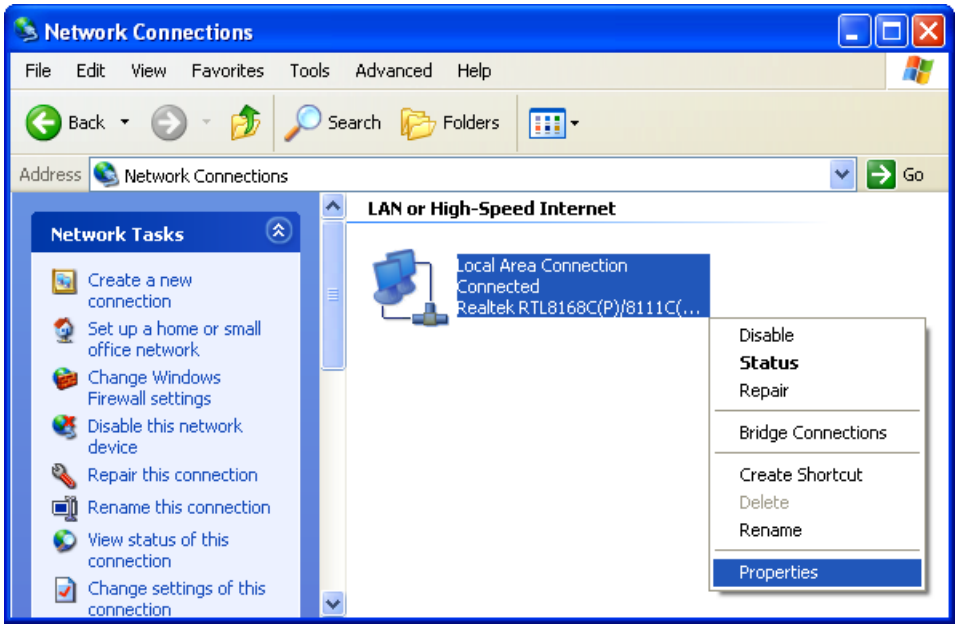
Before starting the Access Point configuration, please kindly configure the PC computer as below, to have automatic IP address / DNS Server.

4.1 Windows 98SE/ME/2000/XP

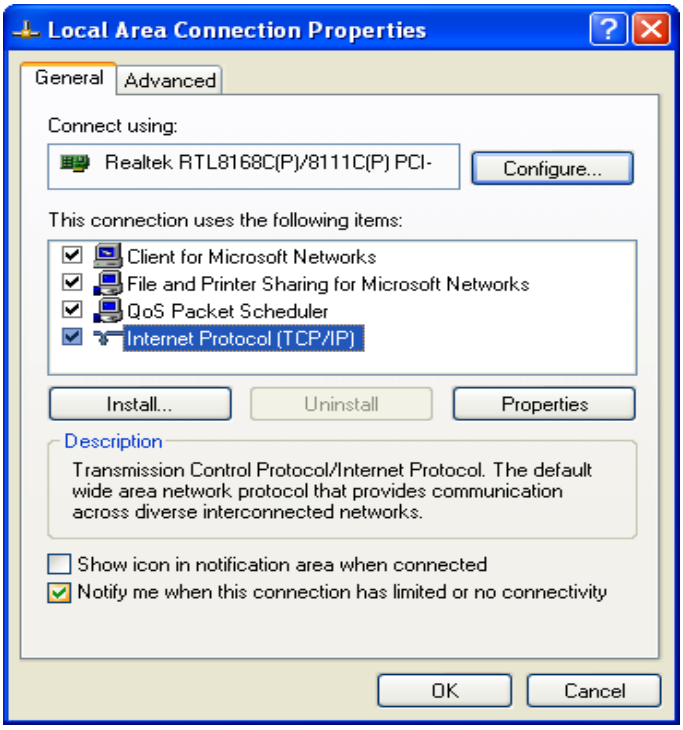
1. Click on "**Start**" **>** "**Control Panel**" **(in Classic View)**. In the Control Panel; double click on "**Network Connections**" to continue.



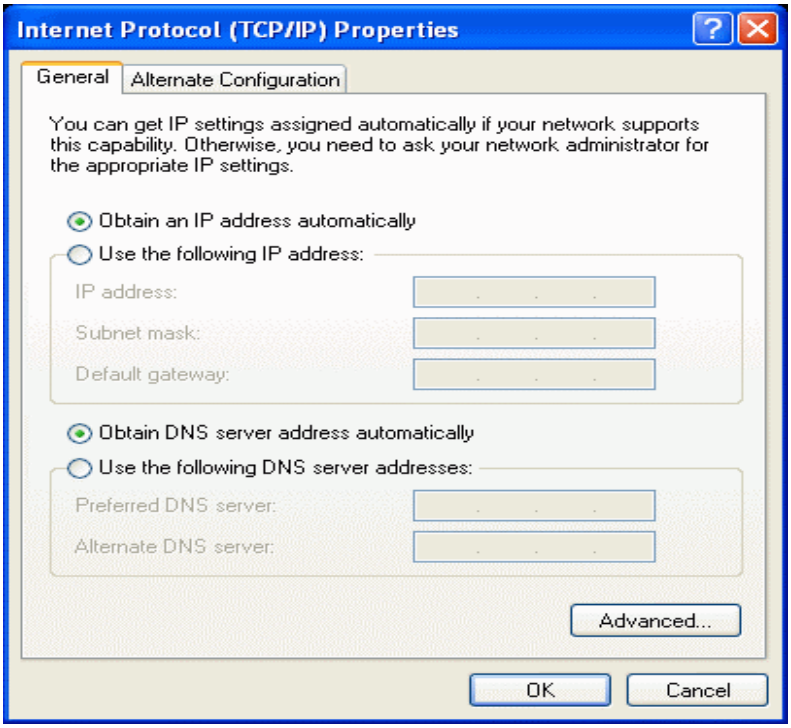
2. Single right click on "**Local Area connection**"**,** then click "**Properties**".



3. Double click on "**Internet Protocol (TCP/IP)**".



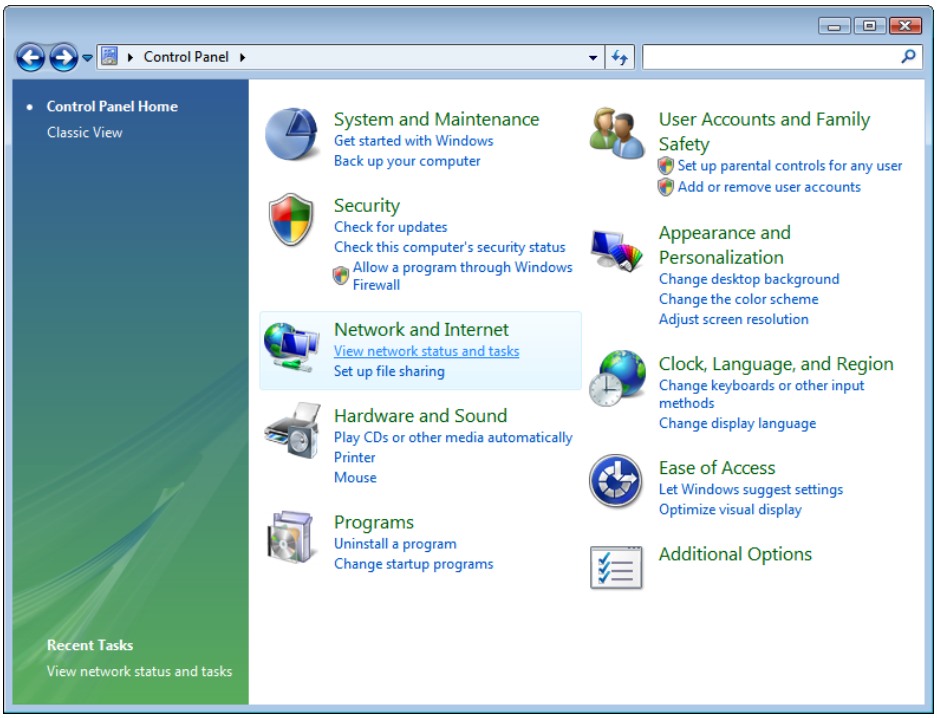
4. Check "**Obtain an IP address automatically**" and "**Obtain DNS server address automatically**" then click on "**OK**" to continue.



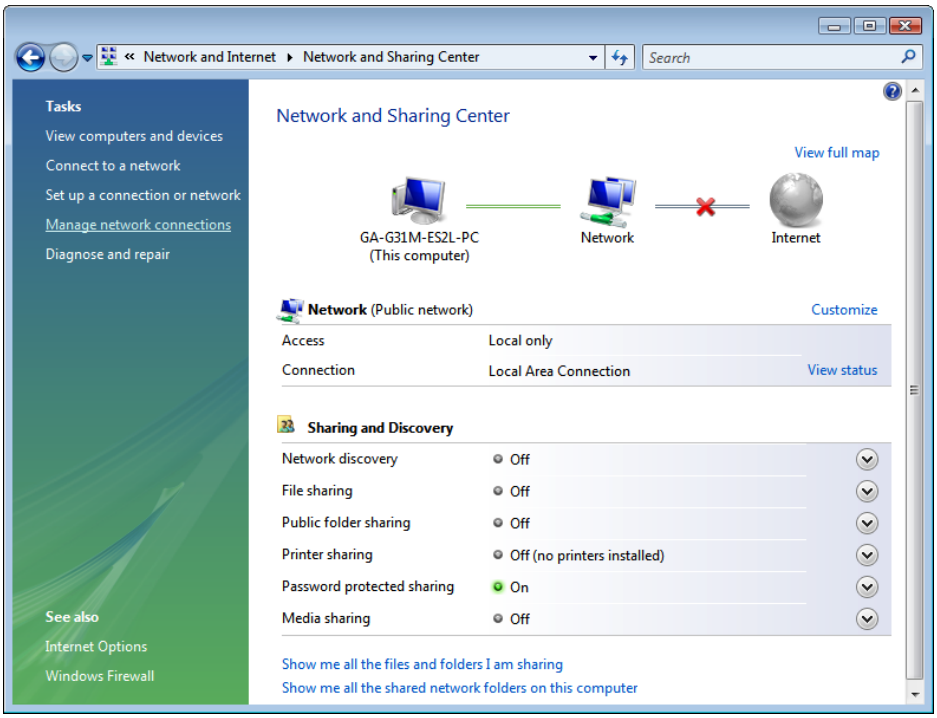
5. Click "**Show icon in notification area when connected**" (see screen image in 3. above) then click on "**OK**" to complete the setup procedures.

4.2 Windows Vista 32/64

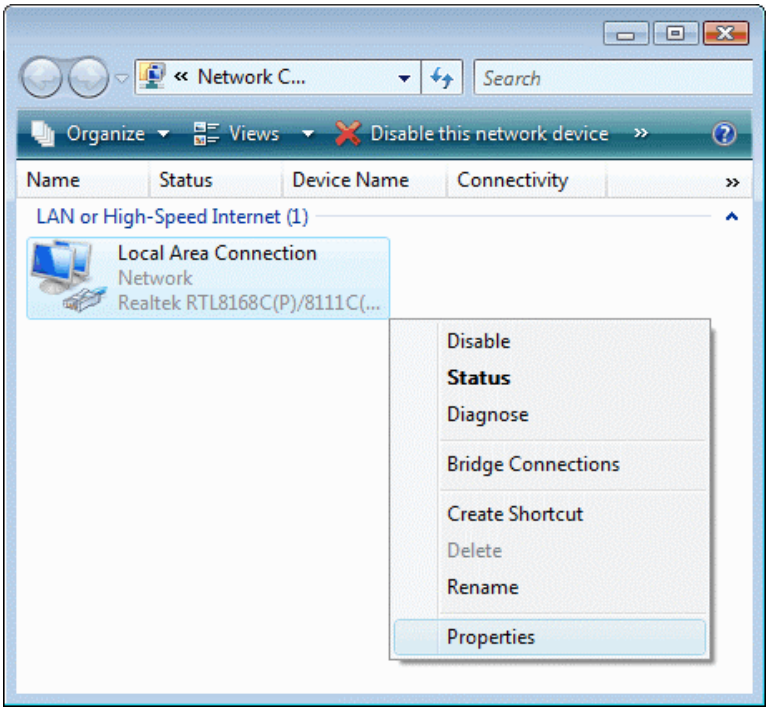
1. Click on “**Start**” > “**Control Panel**” > “**Network and Sharing Center**”.



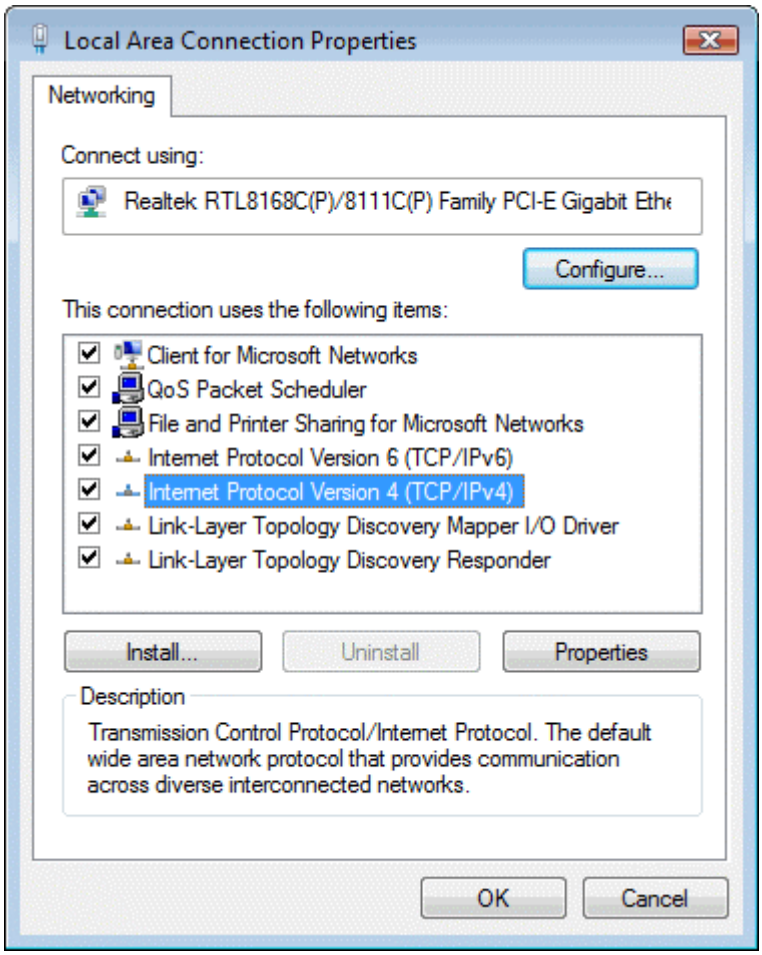
2. In the Manage network connections, click on “**Manage network connections**” to continue.



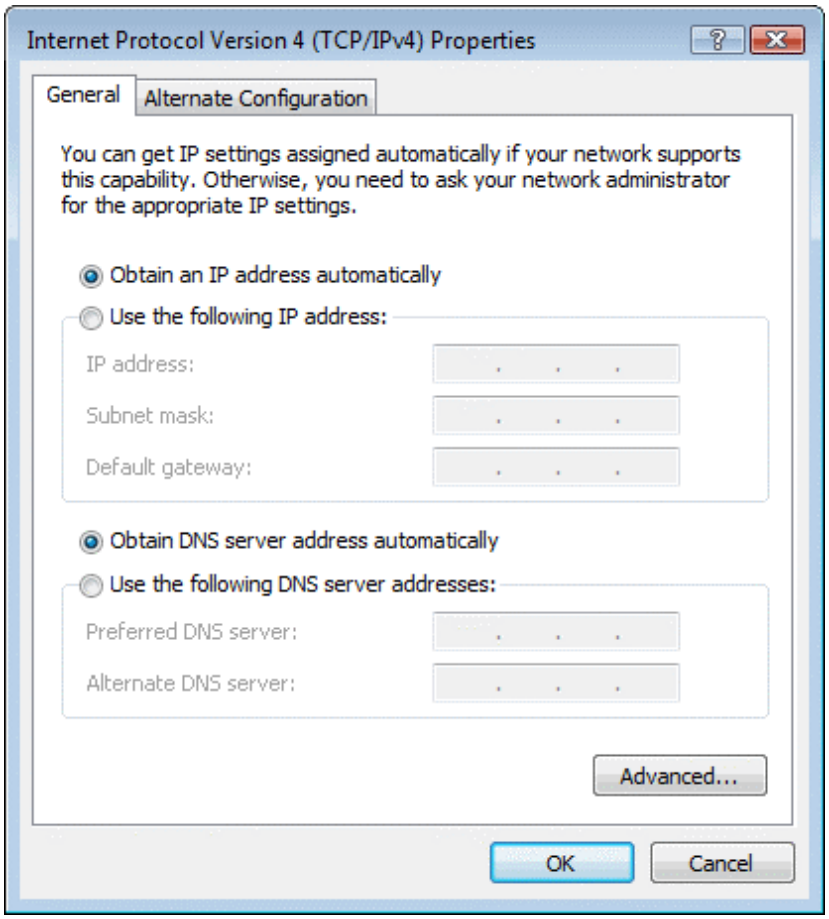
3. Single right click on “**Local Area connection**”, then click “**Properties**”.



4. The screen will display the information “**User Account Control**” and click “**Continue**” to continue.
5. Double click on “**Internet Protocol Version 4 (TCP/IPv4)**”.



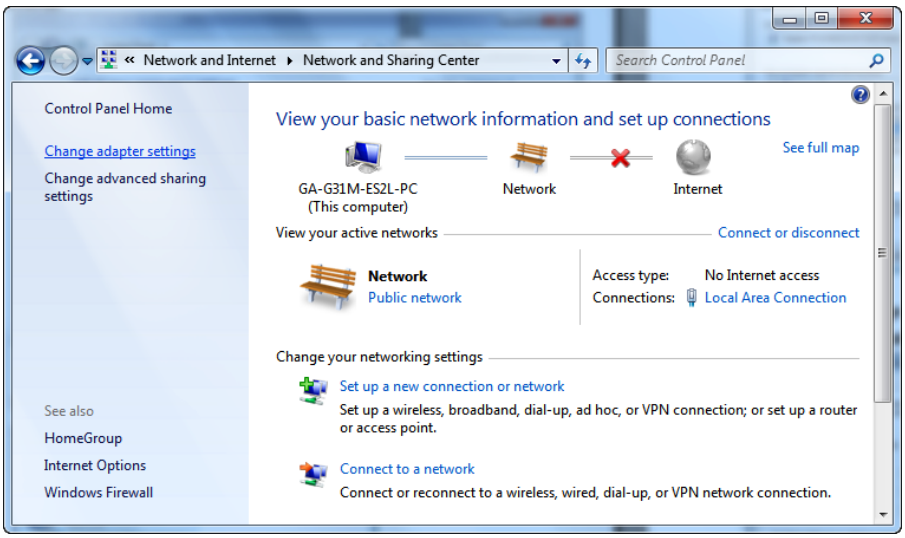
6. Check “**Obtain an IP address automatically**” and “**Obtain DNS server address automatically**” then click on “**OK**” to continue.



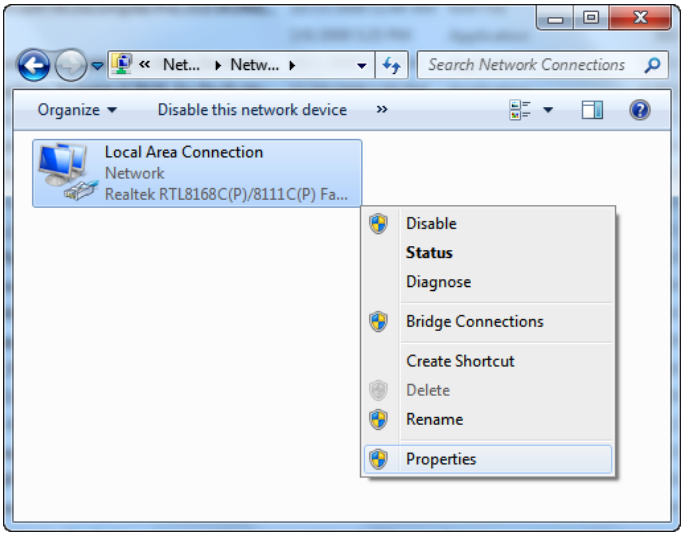
4.3 Windows 7 32/64

1. Click on “**Start**” > “**Control Panel**” (in **Category View**) > “**View network status and tasks**”.

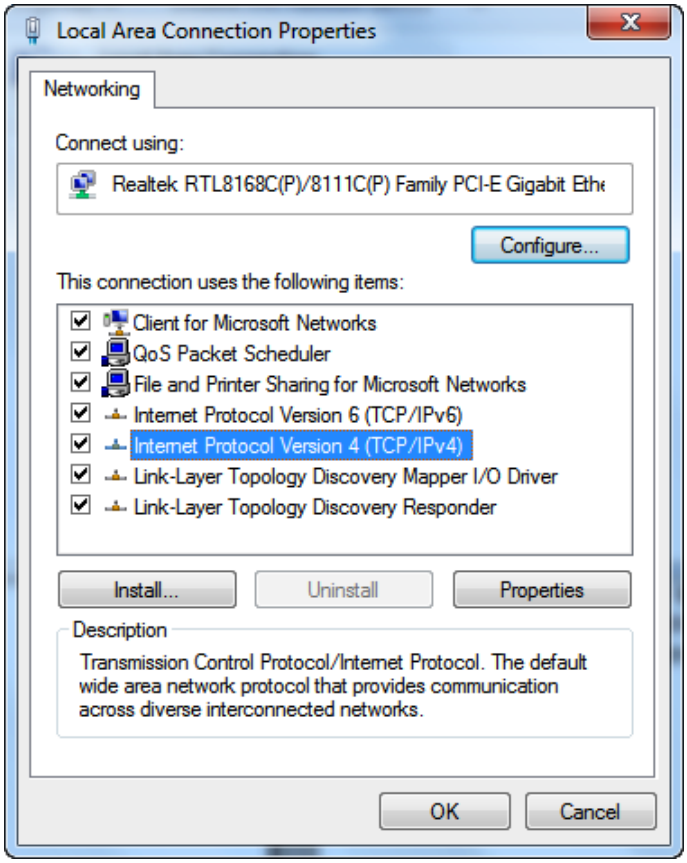
2. In the **Control Panel Home**, click on “**Change adapter settings**” to continue.



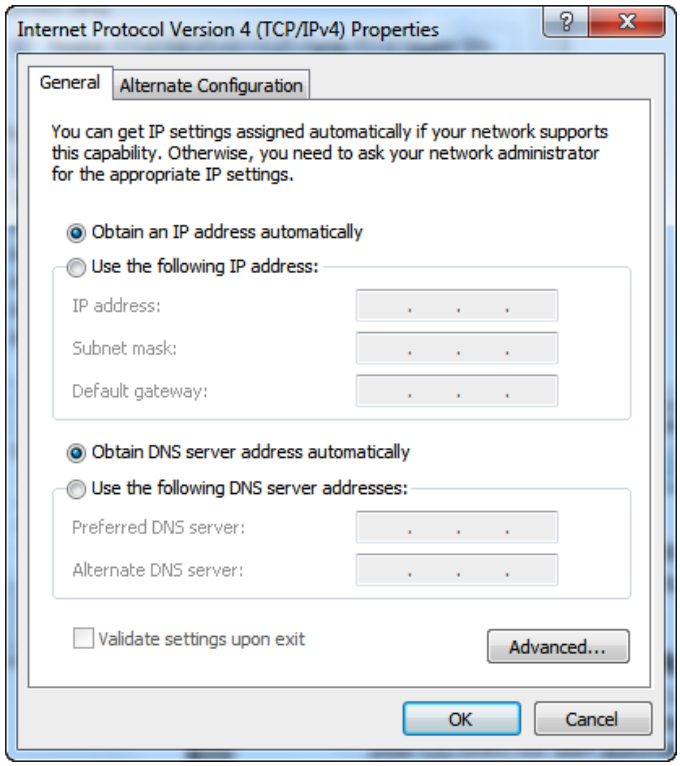
3. Single right click on “**Local Area Connection**”, then click “**Properties**”.



4. Double click on “**Internet Protocol Version 4 (TCP/IPv4)**”.



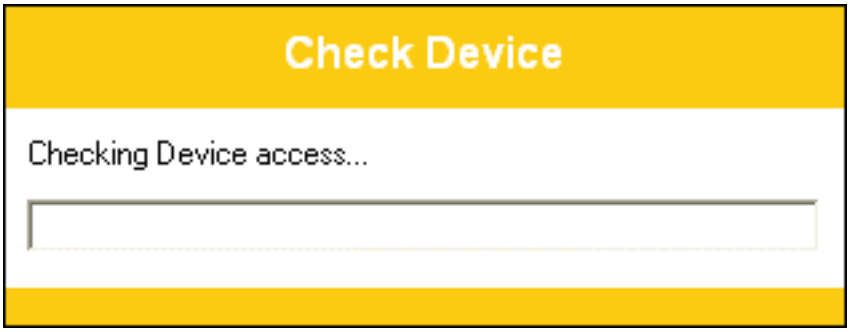
5. Check “**Obtain an IP address automatically**” and “**Obtain DNS server address automatically**” then click on “**OK**” to continue.



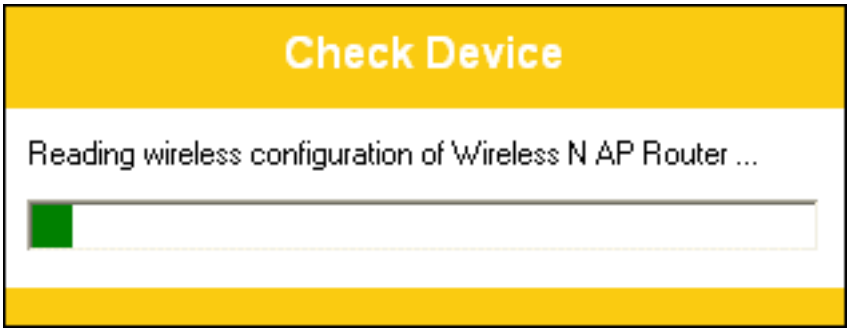
5. Access Point Configuration

1. Please insert the supplied CD into your CD-ROM drive.
2. The CD should auto-start, displaying the window shown in 3 below. If your CD does not start automatically, go to Windows Explorer, Select your CD drive and double click “**autorun.exe**”.
3. The screen below will appear. To configure the device, please click “**Easy Configuration**” button and follow the steps illustrated in the following pages.

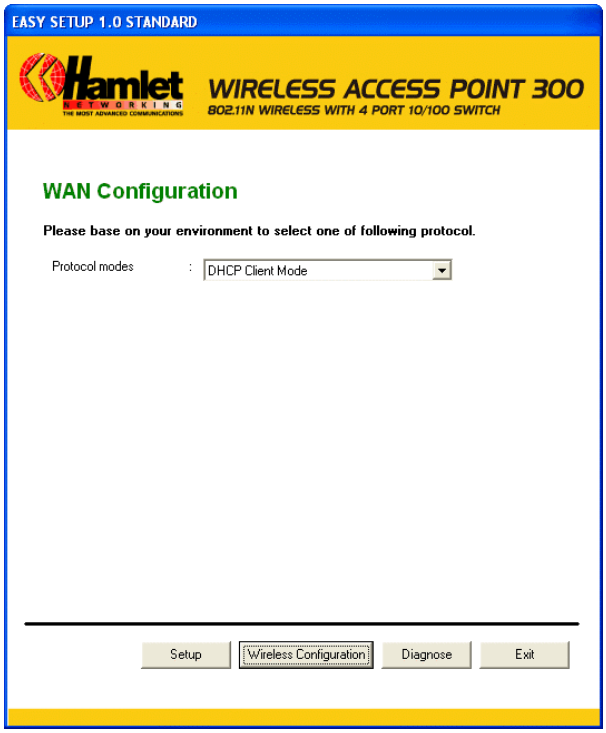
4. The Easy Configuration program is checking device access.



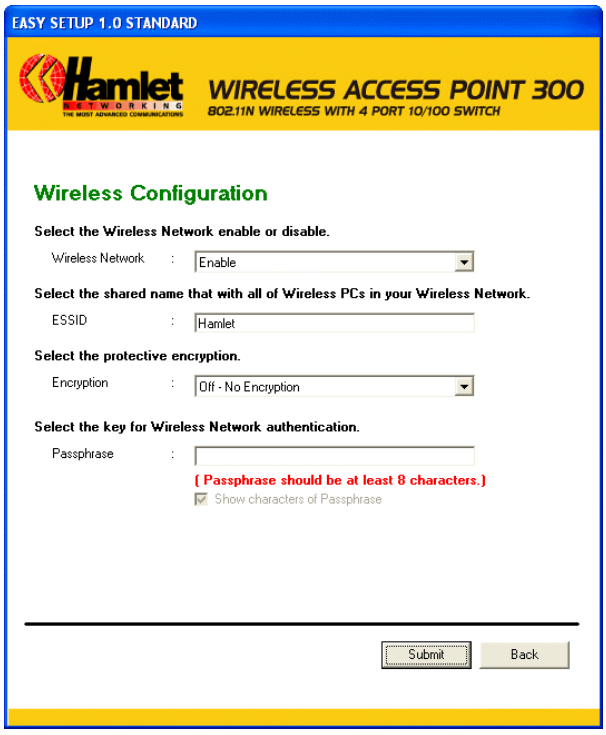
5. The Easy Configuration program is reading the wireless configuration.



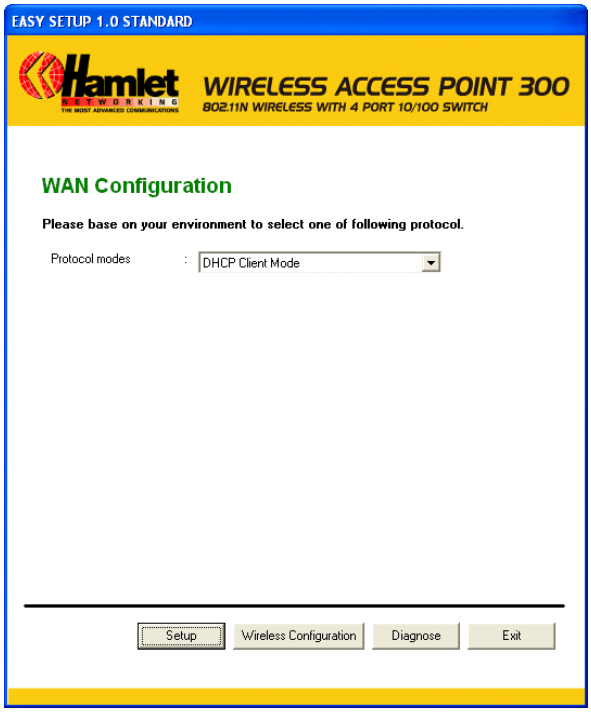
6. Select the Protocol mode Fixed IP, DHCP client or PPPoE Mode and enter related parameters that your ISP (Internet Services Provider) or Network Administrator provided and then click "**Wireless Configuration**".



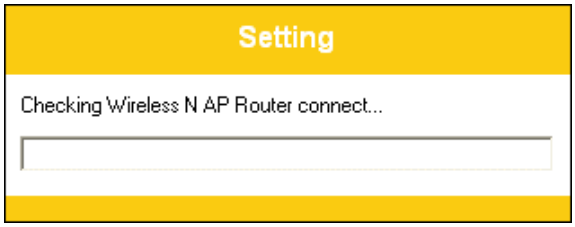
7. Please enter the "**ESSID**" if you want to change the default settings (**Network= Enable**, **ESSID = Hamlet**).
8. Choose the Encryption type if necessary, as **Off – No Encryption (Default)** / 64 Bit Encryption / 128 Bit Encryption / Wi-Fi Protected Access (TKIP) / Wi-Fi Protected Access2 (AES-CCMP) and WPA Mixed Mode. For example, you choose the WPA Mixed Mode type and configure Passphrase.
9. Please click "**Submit**" button to continue.



10. Please click “**Setup**” button, when the procedure is completed, it will start to configure the device for a while.



11. Now, checking Access Point hardware connection, Internet settings, WLAN settings, and connection status.



12. Easy setup configuration completed. Click on "**Close**" to exit this program.

13. Click on "**Exit**" to exit this program.

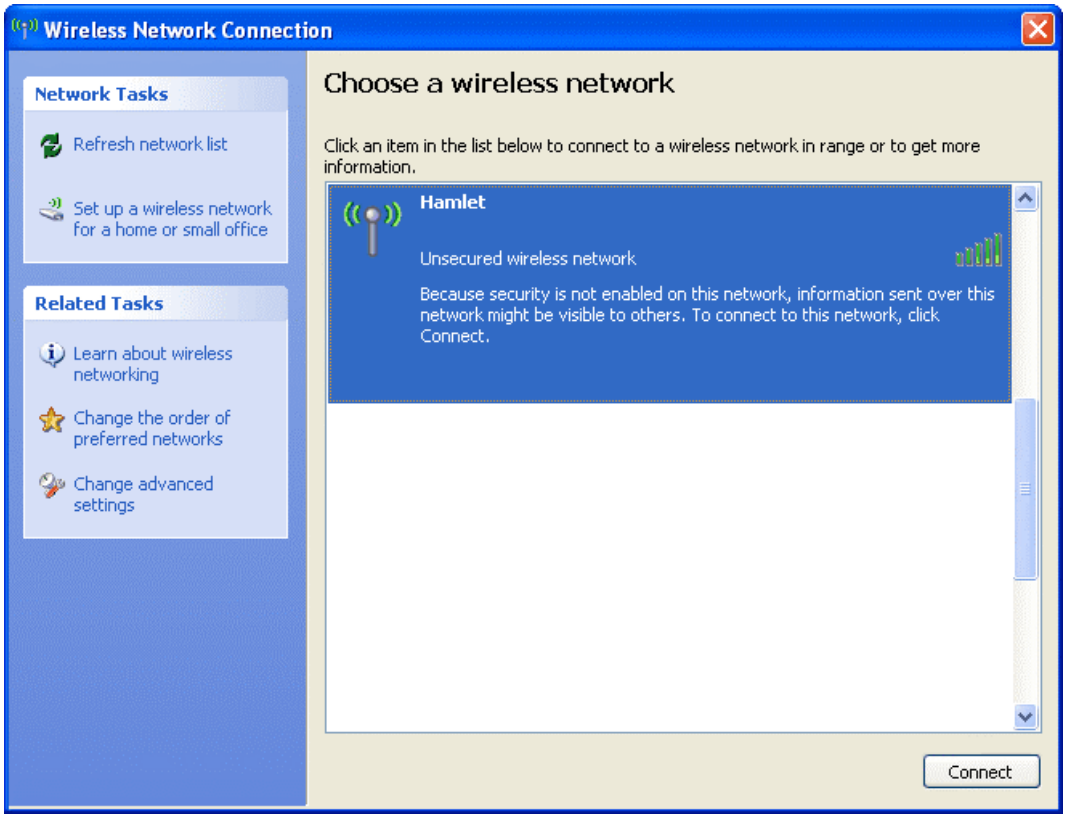
14. Now, the Access Point has been configured completely, and suitable for Wireless and Internet Connections.

6. Connect Wirelessly

Now that the Easy configuration setup is completed, you can connect wirelessly to your Wireless Access Point. Follow the steps below to create a new wireless connection.

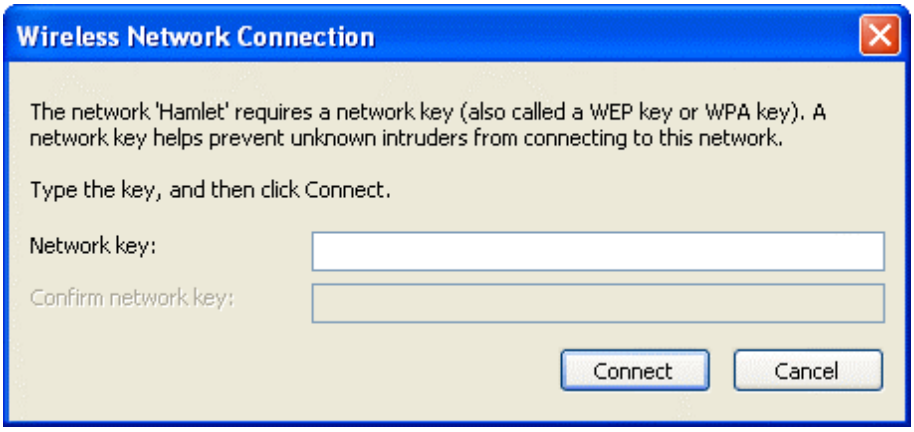
1. Double click on the wireless icon on your computer and search for the wireless network that you enter **ESSID** name.

2. Click on the wireless network that you enter **ESSID** name to connect.

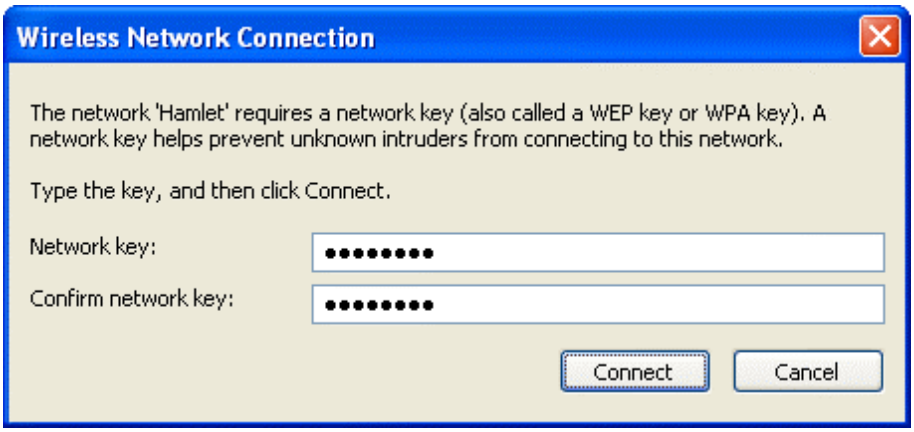


3. If the wireless network isn't encrypted, click on "**Connect Anyway**" to connect.

4. If the wireless network is encrypted, enter the network key that belongs to your Encryption type and Passphrase. You can later change this network key via the wireless configuration menu.



5. Click on "**Connect**" or "**Apply**".



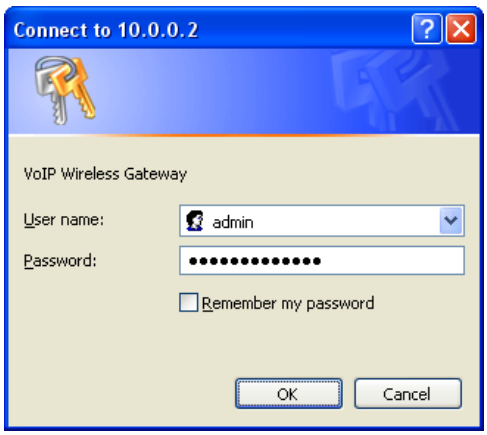
Now, your wireless connection to the Access Point has been configured and you are able to connect to ISP / Website.

7. Web Configuration

The embedded web configuration allows you to manage the Access Point from anywhere through a common web browser such as Internet Explorer or Firefox. Please note that JavaScript must be enabled.

7.1 Accessing the Web Interface

1. Make sure your Access Points properly connected.
2. Prepare your computer/computer network to connect to the Access Point.
3. Launch your web browser and type "**http://192.168.1.254**" in the address bar.
4. An Enter Network Password window displays. Enter the user name ("**admin**" is the default), password ("**hamlet**" is the default) and click **OK**.
5. You should now see the **Status** page of the Router.



Status

This page shows the current status and some basic settings of the device.

System	
Uptime	0day:13h:32m:43s
Firmware Version	v1.4
Customer Version	REAN_v1.4_1T1R_STD_02_91229
Build Time	Tue Dec 29 19:16:36 CST 2009
Wireless Configuration	
Mode	AP
Band	2.4 GHz (B+G+N)
SSID	11n_AP_Router
Channel Number	11
Encryption	Disabled
BSSID	00:13:33:81:96:4f
Associated Clients	1
TCP/IP Configuration	
Attain IP Protocol	Fixed IP
IP Address	10.0.0.2
Subnet Mask	255.255.255.0
Default Gateway	10.0.0.2
DHCP Server	Enabled
MAC Address	00:13:33:81:96:4d
WAN Configuration	
Attain IP Protocol	DHCP
IP Address	192.168.10.42
Subnet Mask	255.255.255.0
Default Gateway	192.168.10.100
MAC Address	00:13:33:81:96:4e

8. Quick Setup

You can use "**Quick Setup**" to setup the Access Point as follows, and the Access Point will connect to the Internet. From the left-hand menu, click on *Quick Setup*. The following page is displayed:

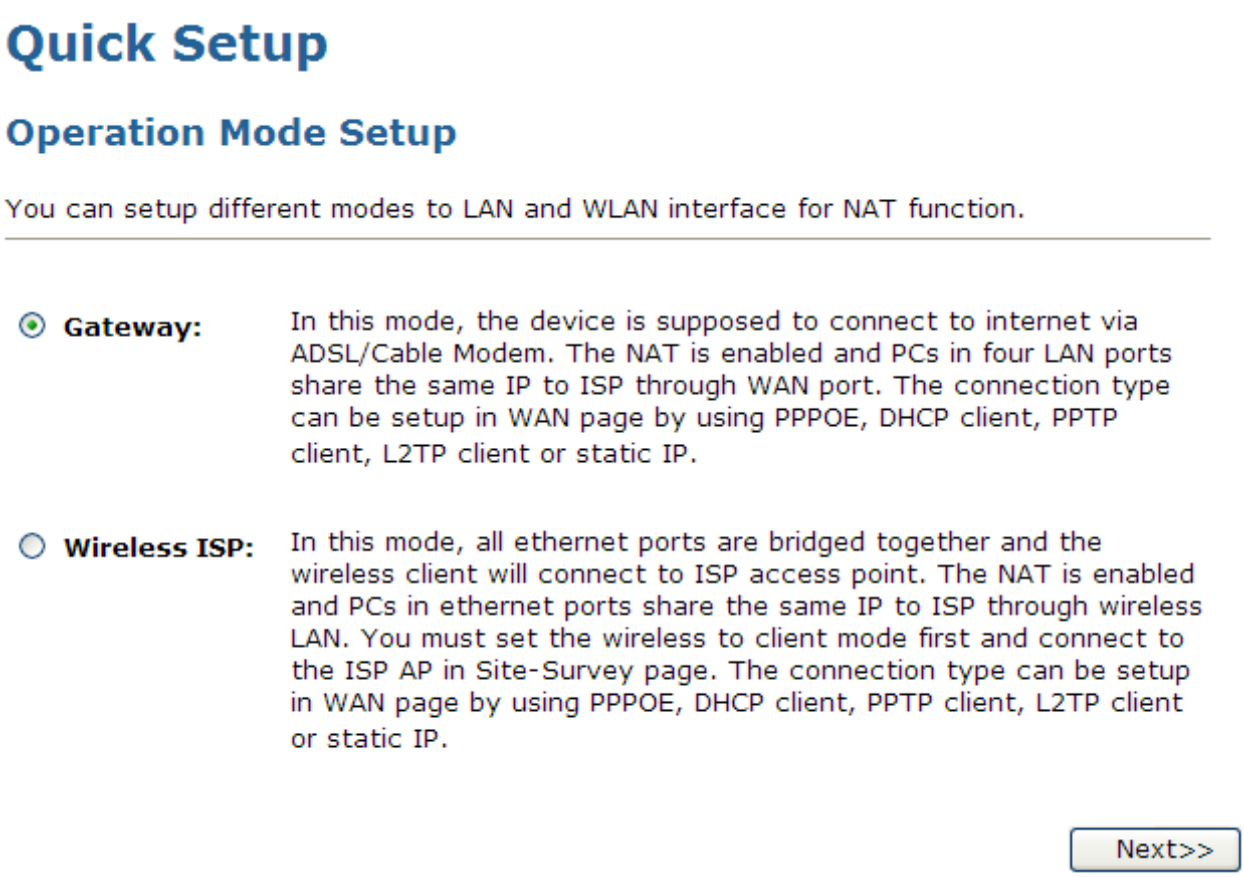


Figure 1: Quick Setup page

8.1 Operation Mode Setup

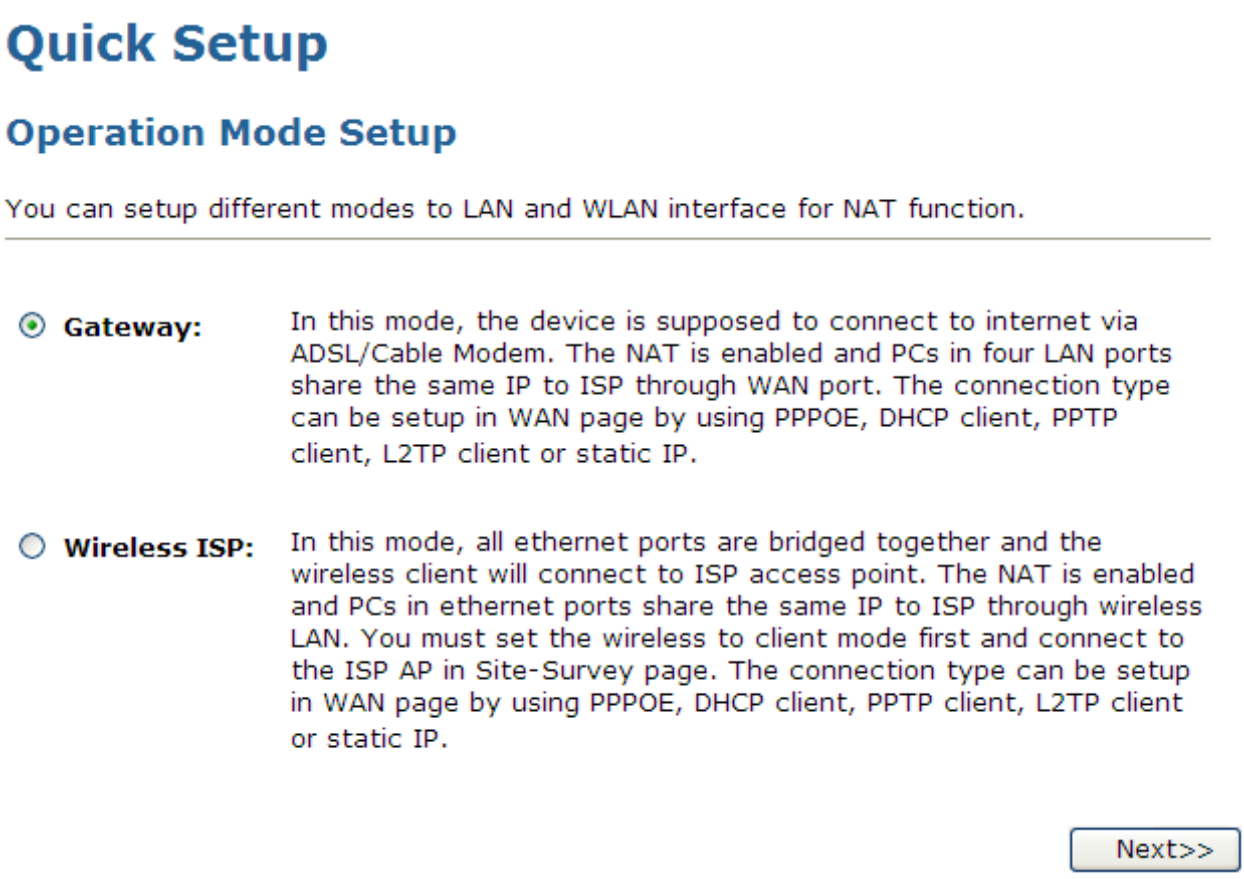
You can setup different modes to LAN and WLAN interface for NAT function.

Gateway

In this mode, the device is supposed to connect to internet via ADSL/Cable Modem. The NAT is enabled and PCs in four LAN ports share the same IP to ISP through WAN port. The connection type can be setup in WAN page by using PPPoE, DHCP client or static IP.

To change the Operation Mode:

1. From the left-hand menu, click on *Quick Setup*. The following page is displayed:
2. Click on the ratio of *Gateway* and then click on *Next>>*.

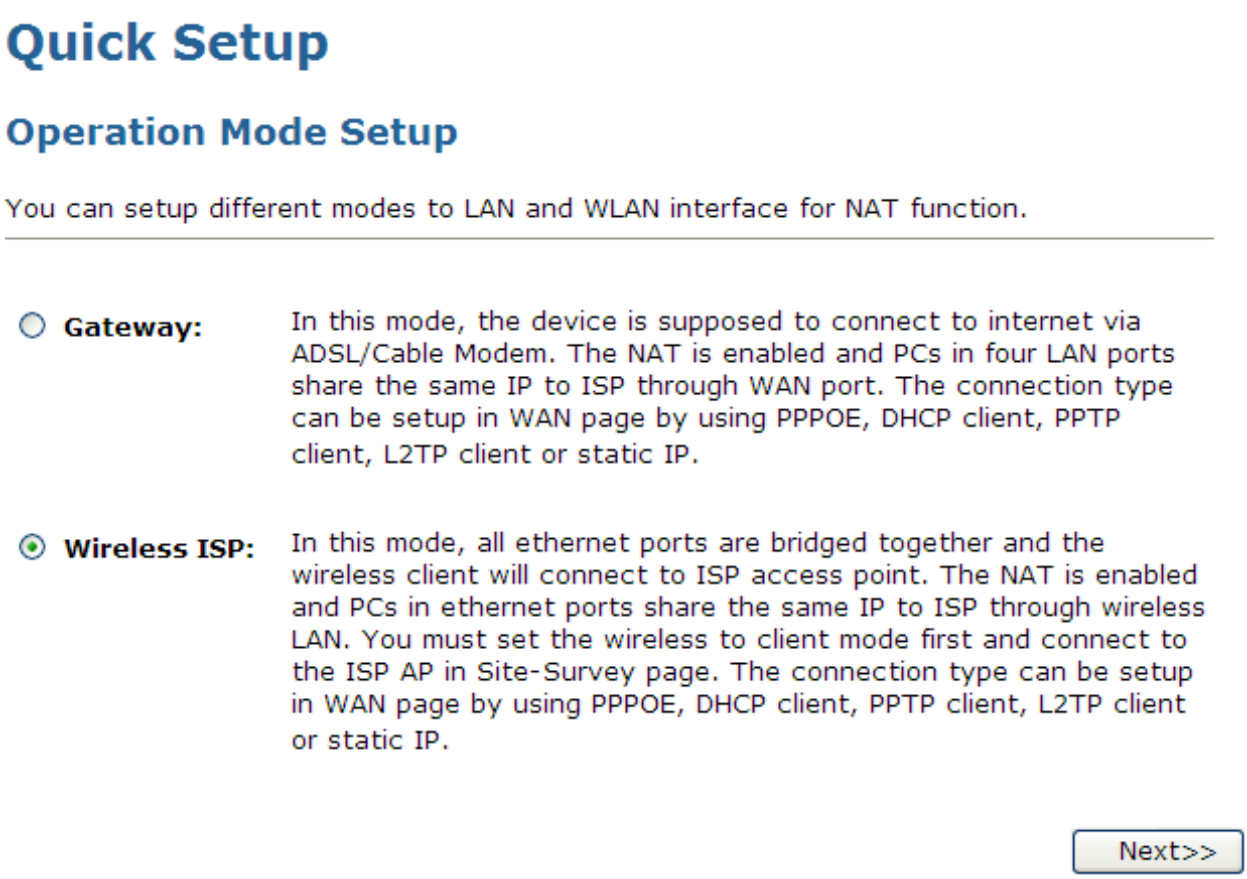


Wireless ISP

In this mode, all Ethernet ports are bridged together and the wireless client will connect to ISP access point. The NAT is enabled and PCs in Ethernet ports share the same IP to ISP through wireless LAN. You must set the wireless to client mode first and connect to the ISP AP in Site-Survey page. The connection type can be setup in WAN page by using PPPOE, DHCP client or static IP.

To change the Operation Mode:

1. From the left-hand menu, click on *Quick Setup*. The following page is displayed:
2. Click on the ratio of *Wireless ISP* and then click on *Next>>*.

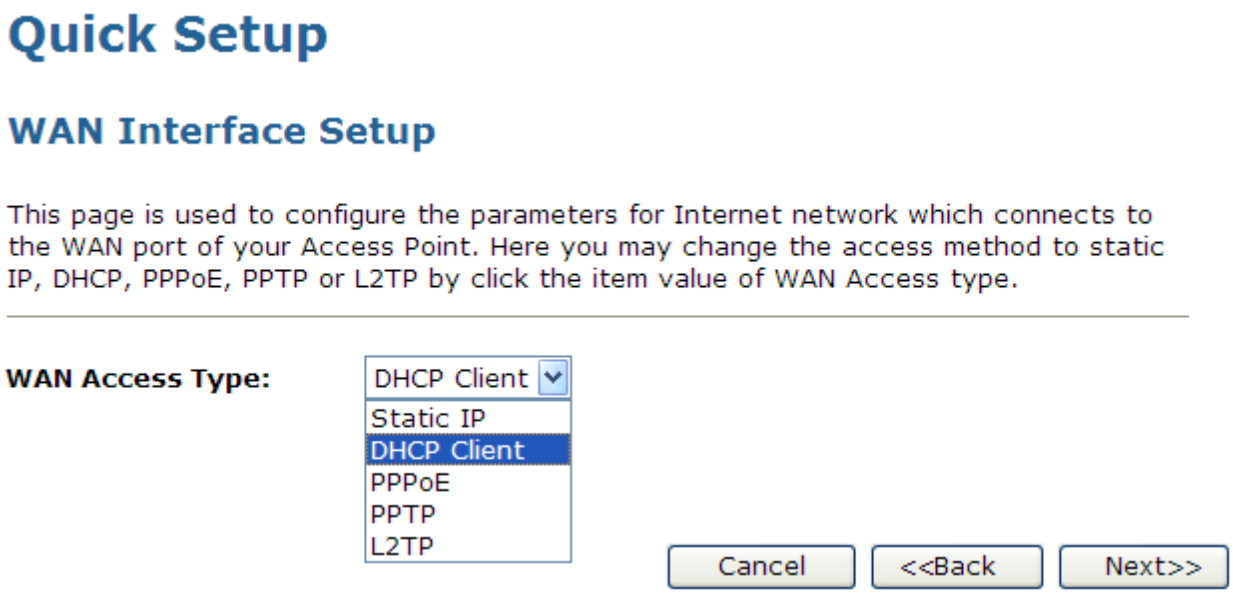


8.2 WAN Interface Setup

This page is used to configure the parameters for Internet network which connects to the WAN port of your Access Point. Here you may change the access method to static IP, DHCP, or PPPoE by click the item value of *WAN Access type*.

To change the WAN Access Type:

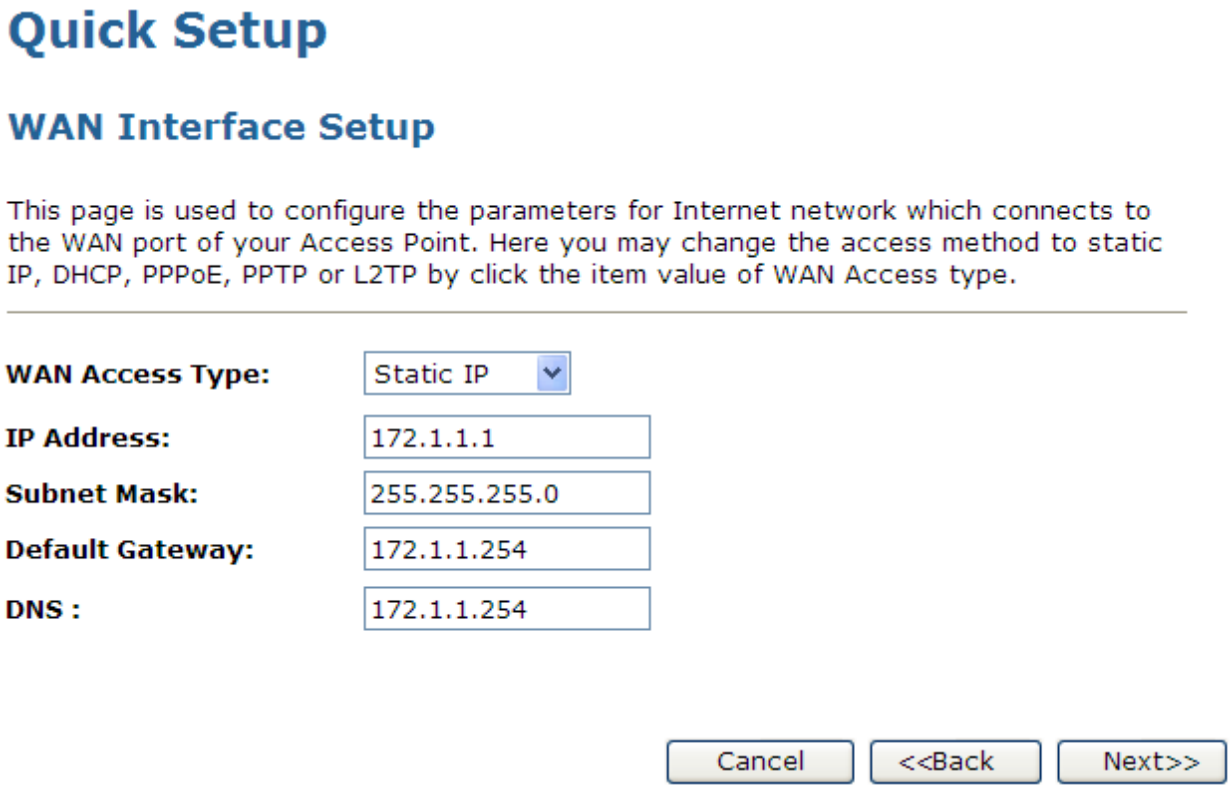
1. From the *WAN Access Type* drop-down list, select *Static IP, DHCP Client, PPPoE, PPTP, or L2TP* setting determined by your Network Administrator or ISP.
2. Click *Next>>*.



Static IP

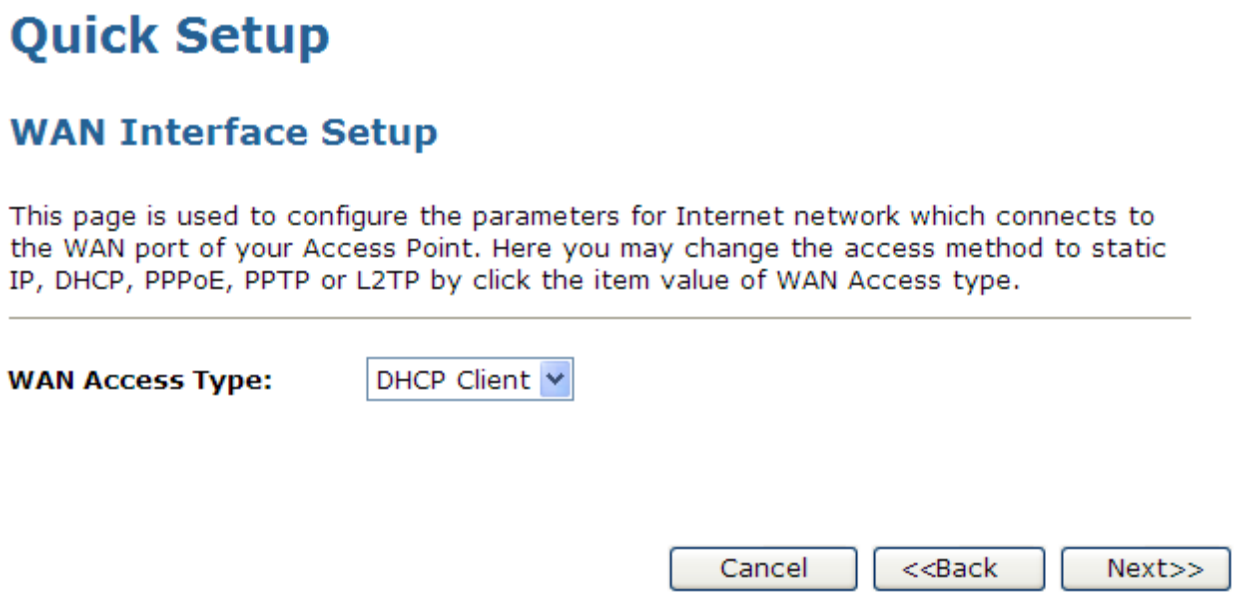
In this mode, the device is supposed to connect to internet via ADSL/Cable Modem. The NAT is enabled and PCs in four LAN ports share the same IP to ISP through WAN port. The connection type can be setup in WAN page by using static IP.

1. From the *WAN Access Type* drop-down list, select *Static IP* setting determined by your Network Administrator or ISP.
2. Enter *IP Address* for example 172.1.1.1.
3. Enter *Subnet Mask* for example 255.255.255.0.
4. Enter *Default Gateway* for example 172.1.1.254.
5. Enter *DNS* for example 172.1.1.254.
6. Click *Next>>*.



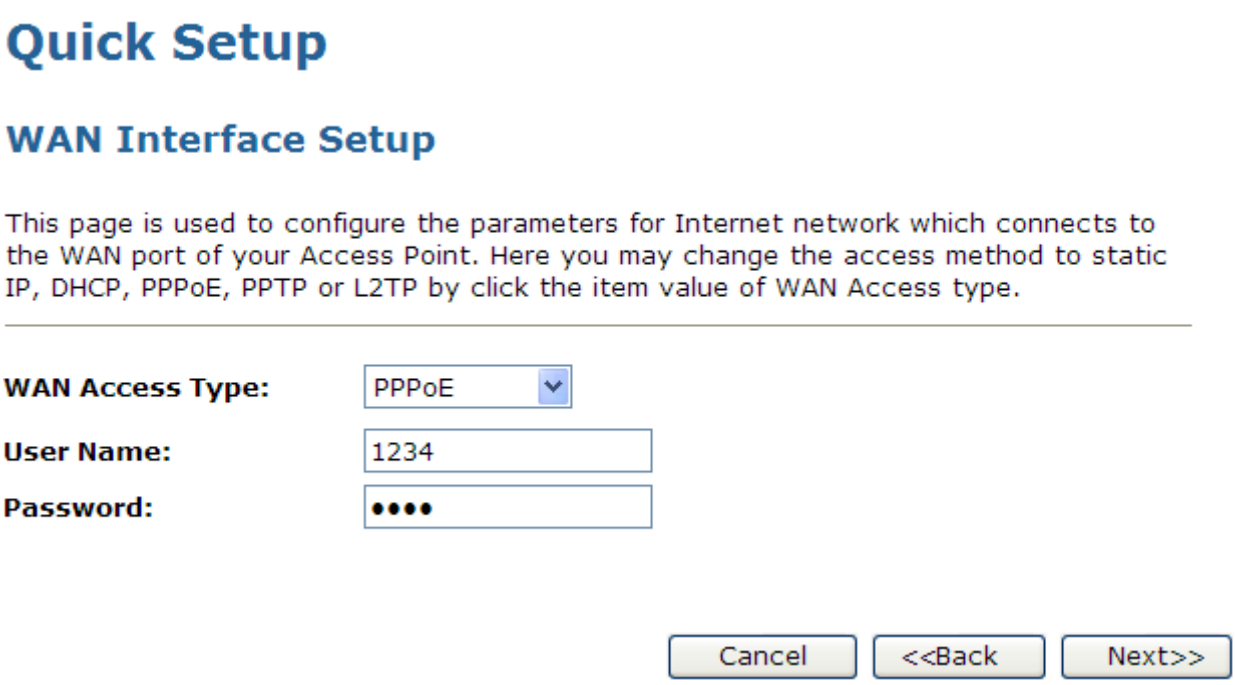
DHCP Client

1. From the *WAN Access Type* drop-down list, select *DHCP Client* setting determined by your Network Administrator or ISP.
2. Click *Next>>*.



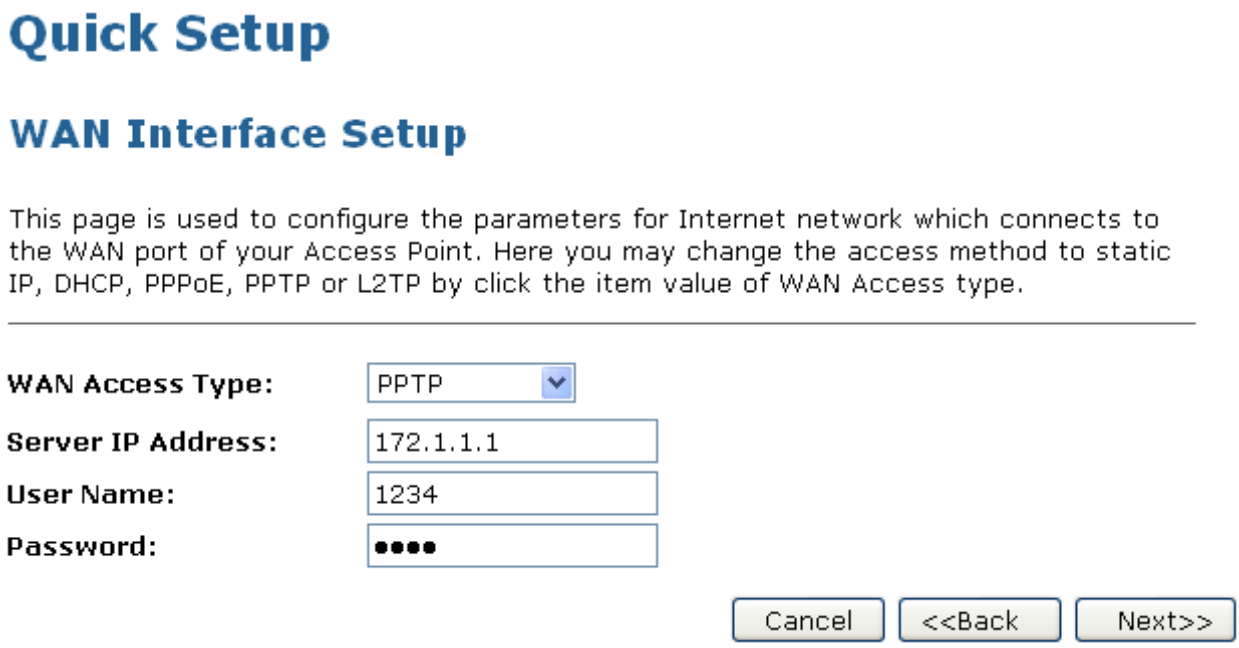
PPPoE

1. From the *WAN Access Type* drop-down list, select *PPPoE* setting determined by your Network Administrator or ISP.
2. Enter *User Name* for example 1234.
3. Enter *Password* for example 1234.
4. Click *Next>>*.



PPTP

1. From the *WAN Access Type* drop-down list, select *PPTP* setting determined by your Network Administrator or ISP.
2. Enter *Server IP Address* for example 172.1.1.1 determined by your Network Administrator or ISP.
3. Enter *User Name* for example 1234 determined by your Network Administrator or ISP.
4. Enter *Password* for example 1234 determined by your Network Administrator or ISP.
5. Click *Next>>*.



L2TP

1. From the *WAN Access Type* drop-down list, select *L2TP* setting determined by your Network Administrator or ISP.
2. Enter *Server IP Address* for example 172.1.1.1 determined by your Network Administrator or ISP.
3. Enter *User Name* for example 1234 determined by your Network Administrator or ISP.
4. Enter *Password* for example 1234 determined by your Network Administrator or ISP.
5. Click *Next>>*.

Quick Setup

WAN Interface Setup

This page is used to configure the parameters for Internet network which connects to the WAN port of your Access Point. Here you may change the access method to static IP, DHCP, PPPoE, PPTP or L2TP by click the item value of WAN Access type.

WAN Access Type: L2TP

Server IP Address: 172.1.1.1

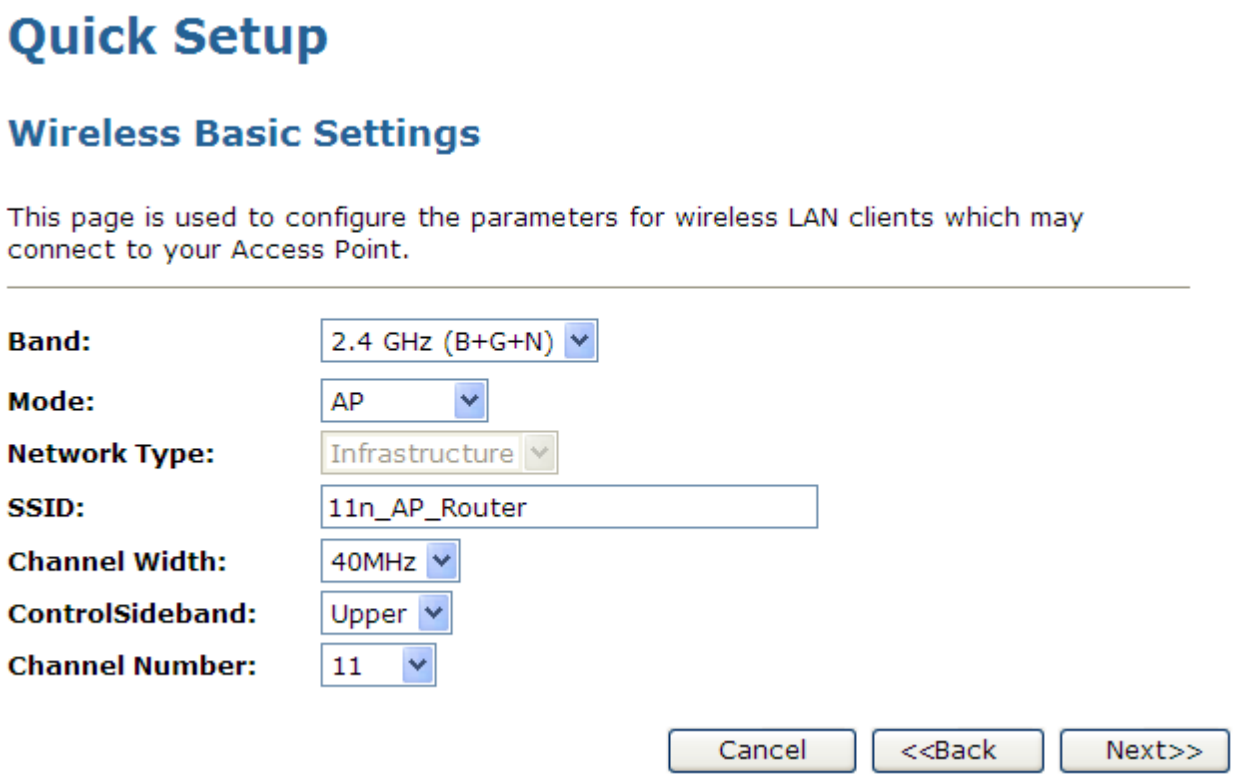
User Name: 1234

Password: ••••

Cancel <<Back Next>>

8.3 Wireless Basic Setup

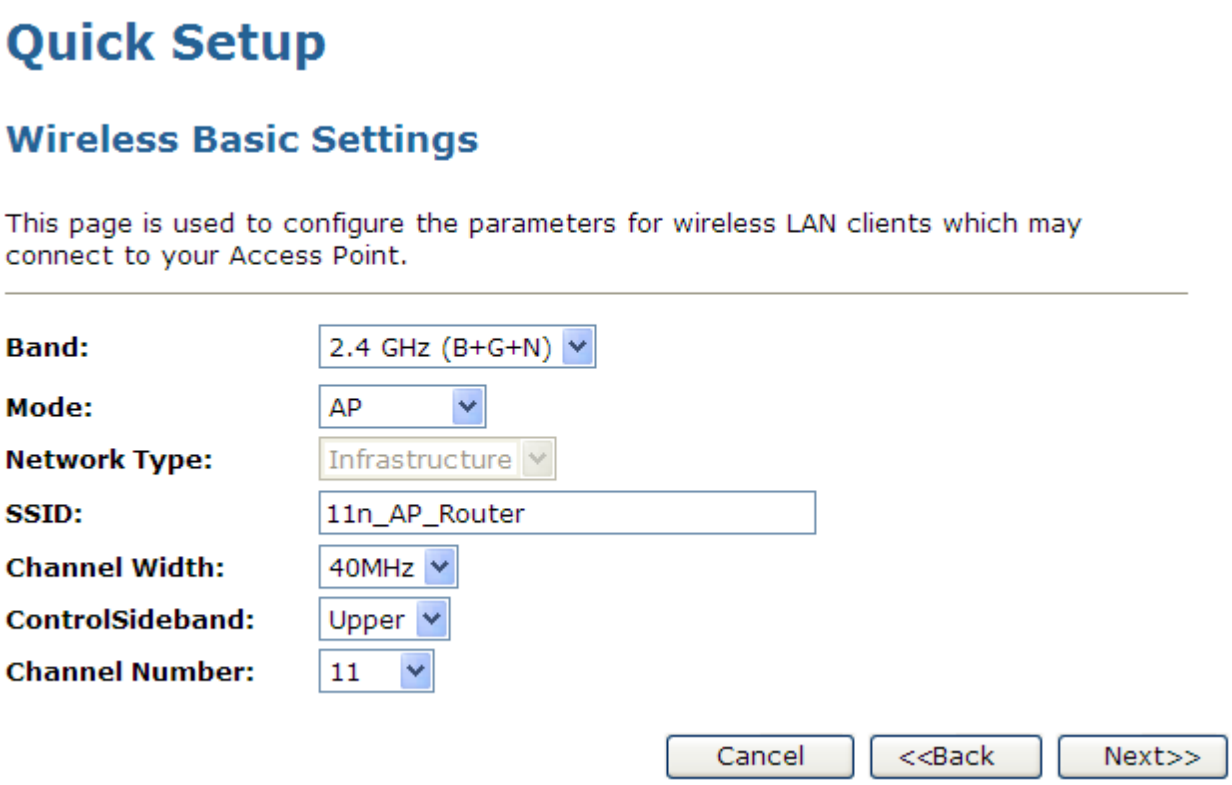
This page is used to configure the parameters for wireless LAN clients which may connect to your Access Point.



AP (Access Point)

Access Point is used to configure the parameters for wireless LAN clients who may connect to your Access Point.

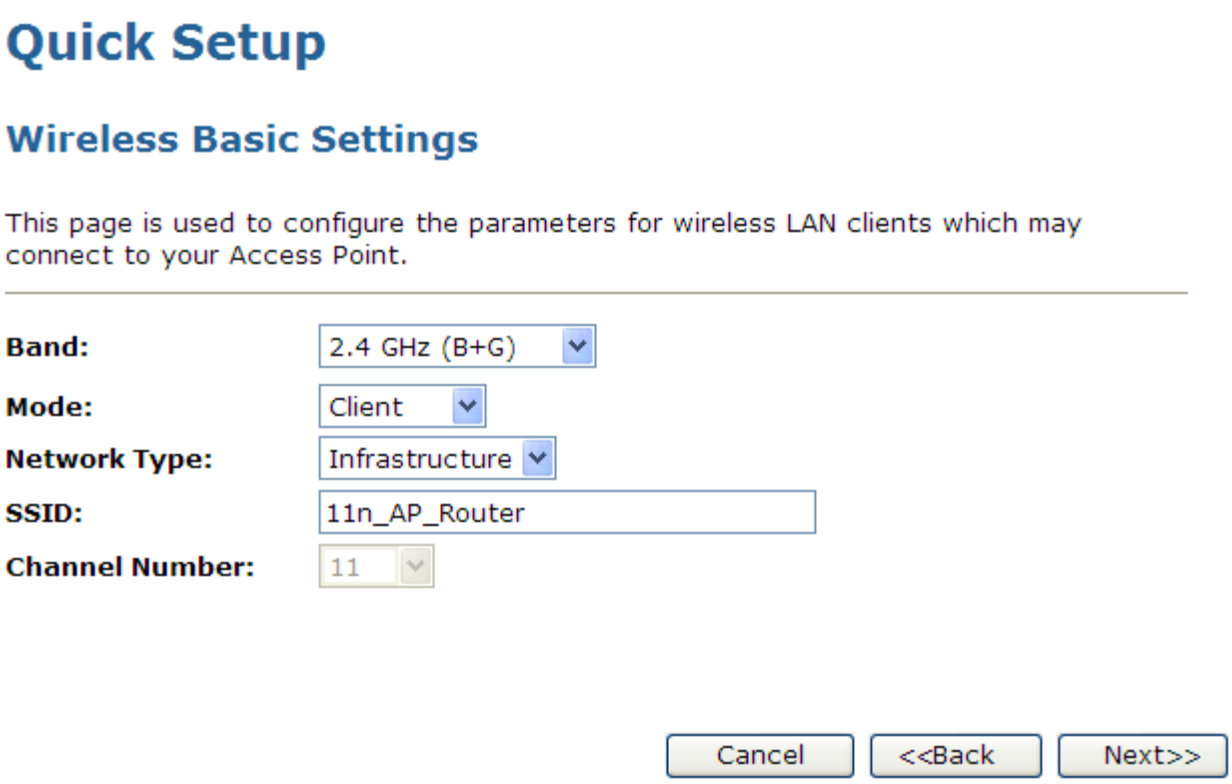
1. From the *Band* drop-down list, select a Band.
2. From the *Mode* drop-down list, select *AP* setting.
3. Enter *SSID* for example 11n_AP_Router.
4. From the *Channel Width* drop-down list, select a Channel Width.
5. From the *ControlSideband* drop-down list, select a ControlSideband.
6. From the *Channel Number* drop-down list, select a Channel Number.
7. Click *Next>>*.



Client

This page is used to configure the parameters for wireless LAN clients which may connect to your Access Point.

1. From the *Band* drop-down list, select a Band.
2. From the *Mode* drop-down list, select *Client* setting.
3. From the *Network Type* drop-down list, select a Type.
4. Enter *SSID* for example 11n_AP_Router.
5. Click *Next>>*.



WDS (Wireless Distribution System)

WDS stands for Wireless Distribution System. It enables the access points (APs) to be connected wirelessly. Integrated Access Device can also provide you services of WDS.

***Note**: Integrated Access Device that supports WDS does not support security systems like WEP, WPA or WPA-Enterprise on a WDS network:*

Sometimes you want to establish a multi-access point wireless network in your home or office, but you don't have Ethernet cabling running to the locations where you want to add the extra AP. After all, you may be using wireless because you don't have wires in place already.

One way to overcome this problem is to use a system built into Wireless Gateway that is known as Wireless Distribution System (WDS).

WDS basically creates a mesh network by providing a mechanism for access points to "talk" to each other as well as sending data to devices associated with them.

***Note:** WDS is based on some standardized 802.11 protocols, but there is no standardized way of implementing it that works across different AP and router vendors. So if you have a Wireless Gateway in one location and you want to create a WDS link to a other brand of router in another location (just to pick two brands at random), you probably won't be able to get it to work. You have your best luck when you use equipment from the same manufacturer*

Note: *When you use WDS as a repeater system, as described below, it effectively halves the data rate for clients connected to Integrated Wireless Gateway. That's because every bit of data needs to be sent twice (data is received by the AP and then retransmitted).*

To configure WDS, you need to modify some settings on each AP within the network. Your exact steps (and the verbiage used) will vary from vendor to vendor. Generally, you'll see some settings like the following:

Main WDS station:

One of your WDS stations is the main base station for the WDS network. This AP is connected directly to your Internet connection, or connected to your router via a wired connection. The main station is the bridge to your Internet connection that all wireless traffic eventually flows through.

Repeater WDS stations:

In a simple, two-AP WDS network, the other "unwired" AP is a repeater. The repeater receives data from the main base station and relays the data to the wireless clients associated to the repeater station (and vice versa for data coming from the clients). If you have more than two APs, remote APs may be repeaters, or they may be relays that provide an intermediate stopping point for data if the repeater is too far away from the main station to communicate.

When you configure your main or base WDS station, take note of the channel you're set to and the ESSID or network name of your network. If your AP has any kind of channel auto configuration function that changes channels based on network conditions, be sure to disable this feature. If your main WDS station is also your network's router, make sure it's set up to distribute IP addresses in the network.

***Note**: Write down or otherwise take note of the MAC addresses of all of your WDS stations — many configuration software systems require you to know these addresses to make the configuration settings work. Write down the wireless MAC address (it's often on a sticker) and not the Ethernet MAC address*

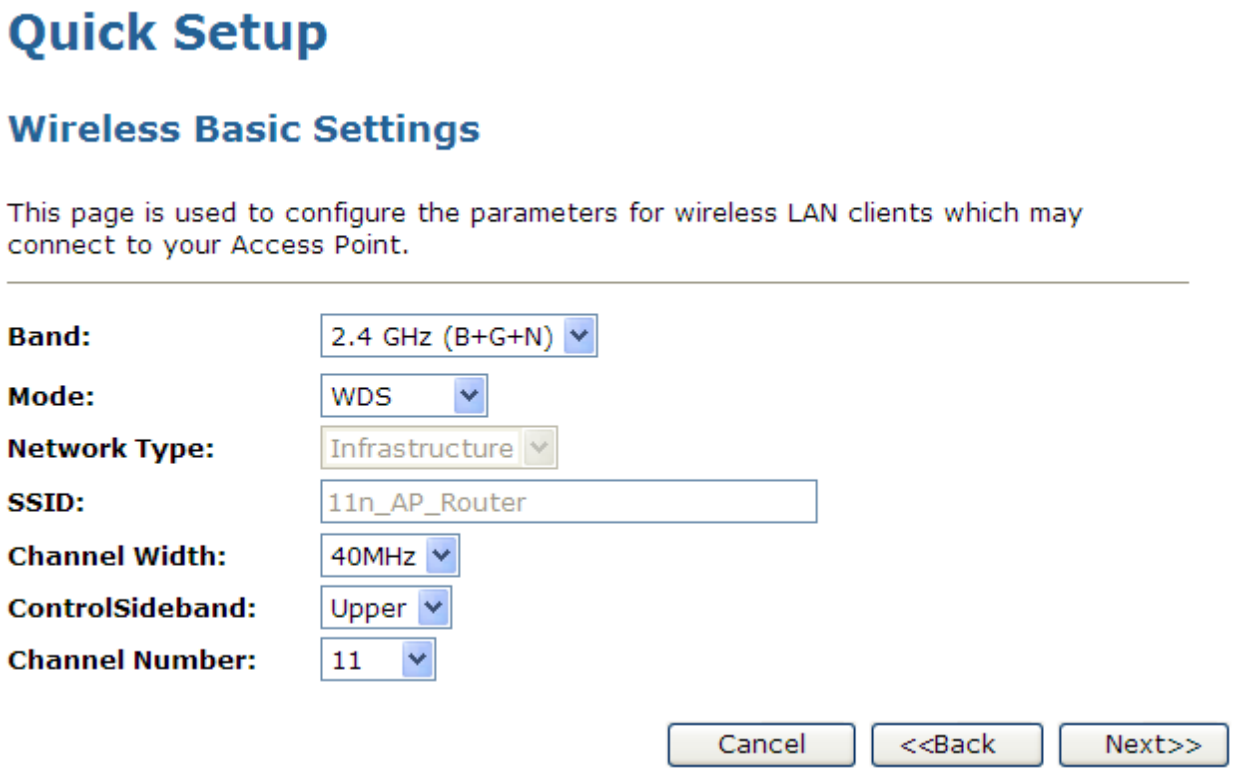
Turn on the WDS functionality in your main station (it's often labeled WDS, or may say something like Enable This Base Station As a WDS Main Base Station — that's the wording Apple uses for their AirPort Extreme products). When you turn on this functionality, the configuration software may ask you to identify the remote repeater(s). Have the MAC addresses of those repeaters handy in case you need them.

Depending upon how your software works, you may have to separately access the configuration software on the remote repeater APs to turn on WDS. Here are a few things to remember:

- You need to assign any other WDS stations to the same channel that your main base station is using. This is counterintuitive to many folks who have had the 802.11b/g "use channels 1, 6, and 11 and keep your APs on different channels" mantra driven into their heads for a long time!
- You set the ESSID of the remote location(s) using either a unique name or by using the same ESSID as you use for your main base station. (Whoa, our heads just exploded!) Using the same ESSID (a "roaming" network) is pretty cool. You associate with one AP one time and then your PC or Mac can associate with any AP on your WDS network without you having to do anything — it's more seamless this way. But remember, you don't have to do this — you can give each AP a unique ESSID and just configure your computer to associate with them according to your preference.
- Make sure you turn off any routing or DHCP functionality in the remote repeater stations. All of this functionality should be performed in the main base station or the network's main router.

WDS (Wireless Distribution System) only

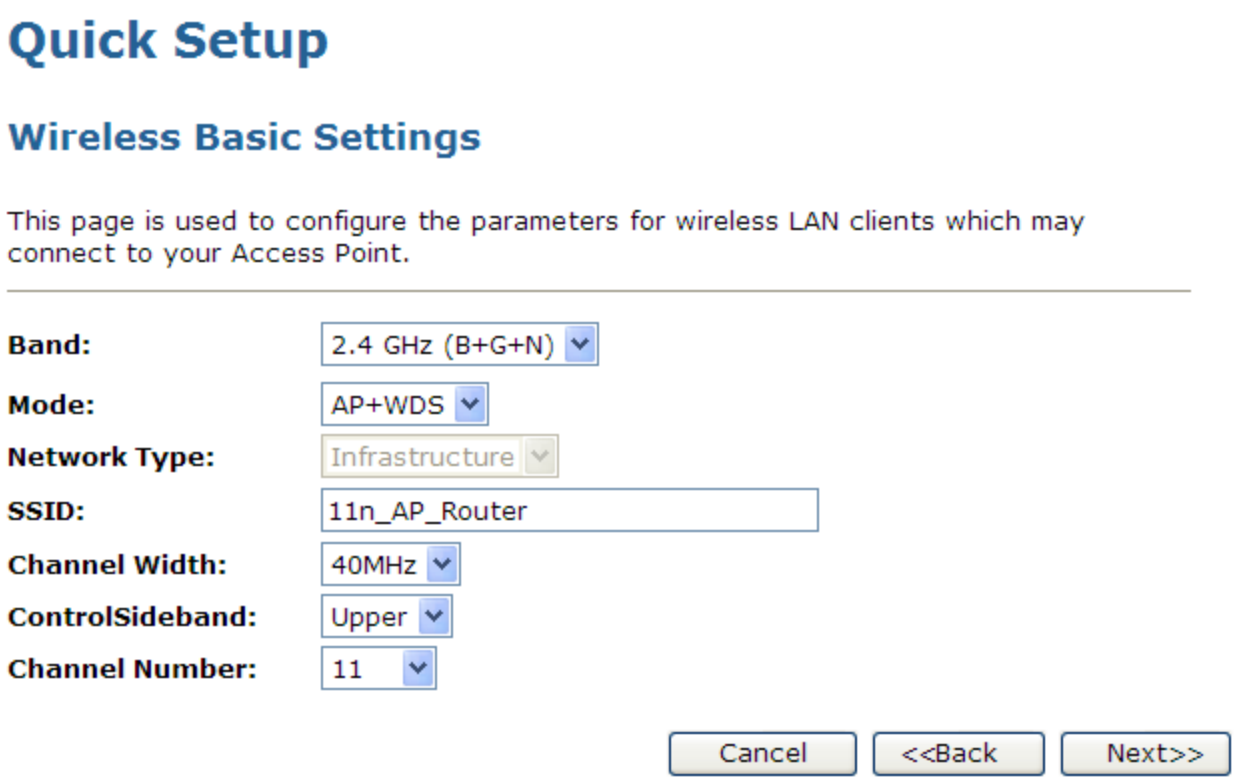
1. From the *Band* drop-down list, select a Band.
2. From the *Mode* drop-down list, select *WDS* setting.
3. From the *Channel Width* drop-down list, select a Channel Width.
4. From the *ControlSideband* drop-down list, select a ControlSideband.
5. From the *Channel Number* drop-down list, select a Channel Number.
6. Click *Next>>*.



AP (Access Point) + WDS (Wireless Distribution System)

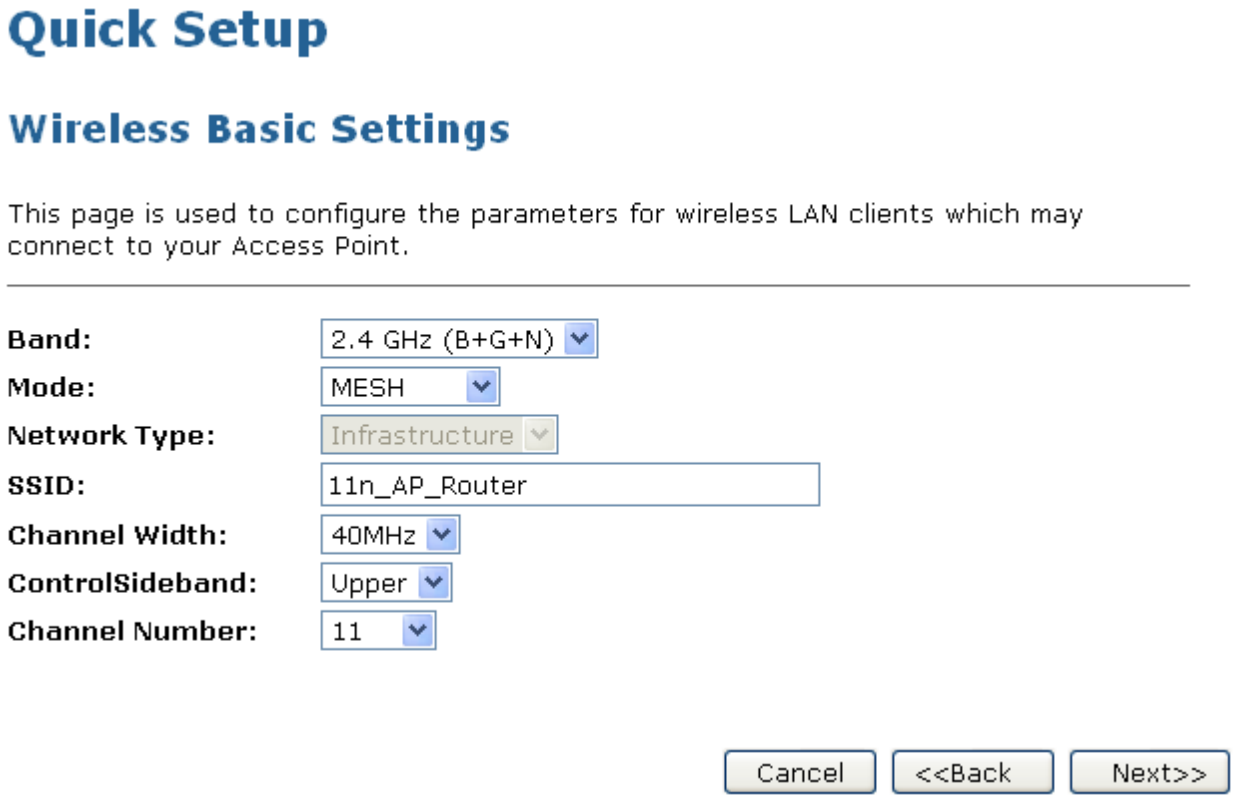
Access Point is used to configure the parameters for wireless LAN clients which may connect to your Access Point.

1. From the *Band* drop-down list, select a Band.
2. From the *Mode* drop-down list, select *AP+WDS* setting.
3. Enter *SSID* for example 11n_AP_Router.
4. From the *Channel Width* drop-down list, select a Channel Width.
5. From the *ControlSideband* drop-down list, select a ControlSideband.
6. From the *Channel Number* drop-down list, select a Channel Number.
7. Click *Next>>*.



MESH only

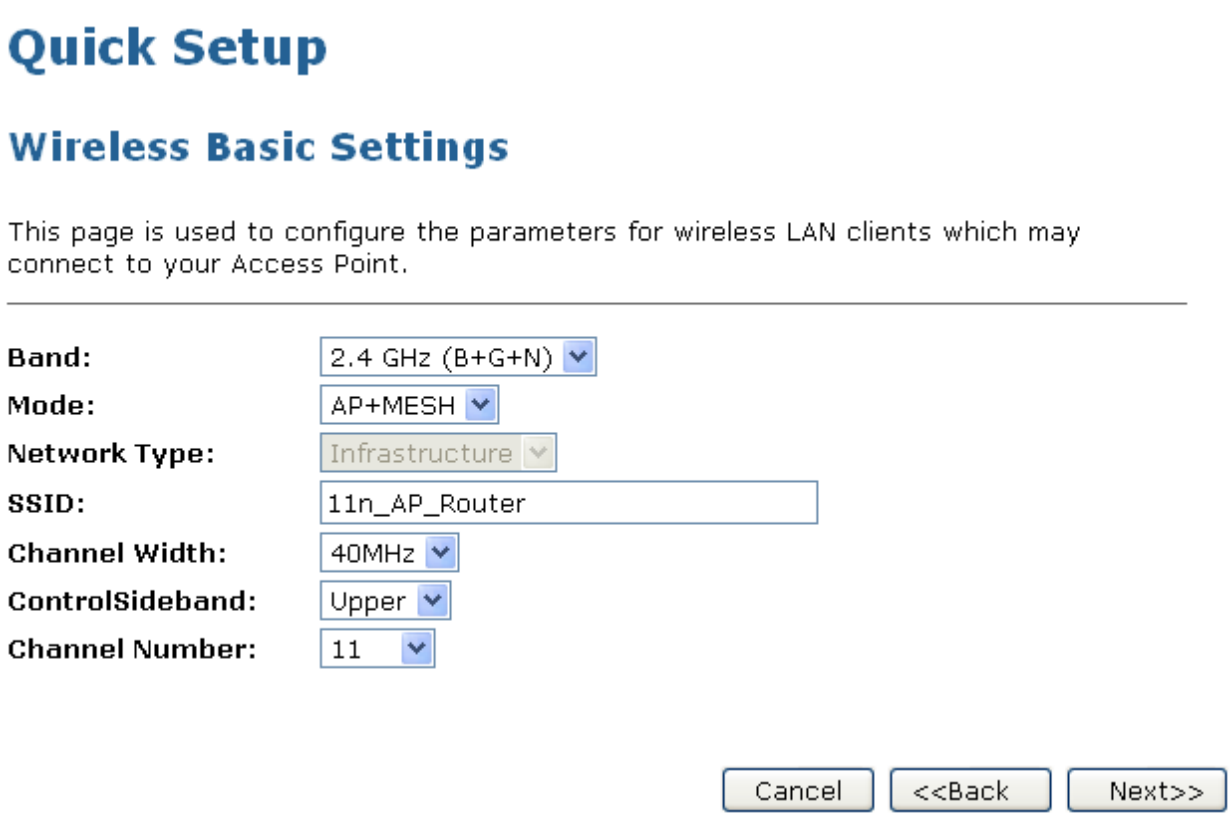
1. From the *Band* drop-down list, select a Band.
2. From the *Mode* drop-down list, select *MESH* setting.
3. From the *Channel Width* drop-down list, select a Channel Width.
4. From the *ControlSideband* drop-down list, select a ControlSideband.
5. From the *Channel Number* drop-down list, select a Channel Number.
6. Click *Next>>*.



AP (Access Point) + MESH

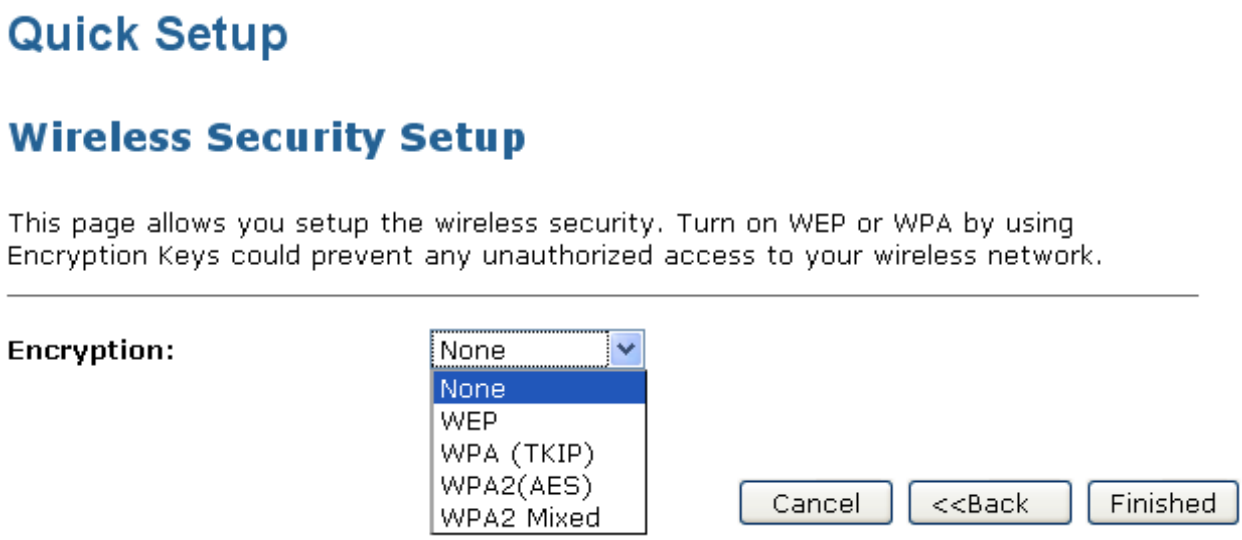
Access Point is used to configure the parameters for wireless LAN clients which may connect to your Access Point.

1. From the *Band* drop-down list, select a Band.
2. From the *Mode* drop-down list, select *AP+MESH* setting.
3. Enter *SSID* for example 11n_AP_Router.
4. From the *Channel Width* drop-down list, select a Channel Width.
5. From the *ControlSideband* drop-down list, select a ControlSideband.
6. From the *Channel Number* drop-down list, select a Channel Number.
7. Click *Next>>*.



8.4 Wireless Security Setup

This page allows you setup the wireless security. Turn on WEP or WPA by using Encryption Keys could prevent any unauthorized access to your wireless network.



You can protect your wireless data from potential *eavesdroppers* by encrypting wireless data transmissions. An eavesdropper might set up a compatible wireless adapter within range of your device and attempt to access your network. Data encryption is the translation of data into a form that cannot be easily understood by unauthorized users.

There are two methods of wireless security to choose from:

- *Wired Equivalent Privacy (WEP)*; data is encrypted into blocks of either 64 bits length or 128 bits length. The encrypted data can only be sent and received by users with access to a private network key. Each PC on your wireless network must be manually configured with the same key as your device in order to allow wireless encrypted data transmissions. Eavesdroppers cannot access your network if they do not know your private key. WEP is considered to be a low security option.
- *Wi-Fi Protected Access (WPA)*; provides a stronger data encryption method (called Temporal Key Integrity Protocol (TKIP)). It runs in a special, easy-to-set-up home mode called Pre-Shared Key (PSK) that allows you to manually enter a pass phrase on all the devices in your wireless network. WPA data encryption is based on a WPA master key. The master key is derived from the pass phrase and the network name (SSID) of the device.

To configure security, choose one of the following options:

- If you do not want to use Wireless Network security, From the *Encryption* drop-down list, select *None* setting and then click *Finished. None* is the default setting, but you are **strongly recommended** to use wireless network security on your device.
- If you want to use WEP 64bit ASCII (5 characters) data encryption, follow the instructions in *Configuring 64bit ASCII (5 characters) encryption*.
- If you want to use WEP 64bit Hex (10 characters) data encryption, follow the instructions in *Configuring WEP 64bit Hex (10 characters) security*.
- If you want to use WEP 128bit ASCII (5 characters) data encryption, follow the instructions in *Configuring WEP 128bit ASCII (5 characters) security*.
- If you want to use WEP 128bit Hex (10 characters) data encryption, follow the instructions in *Configuring WEP 128bit Hex (10 characters) security*.
- If you want to use WPA1 - *Wi-Fi Protected Access 1 (TKIP) Passphrase encryption*, follow the instructions in *Configuring WPA (TKIP) Passphrase security*.
- If you want to use WPA1 - *Wi-Fi Protected Access 1 (TKIP) HEX (64 characters) encryption*, follow the instructions in *Configuring WPA (TKIP) HEX (64 characters) security*.

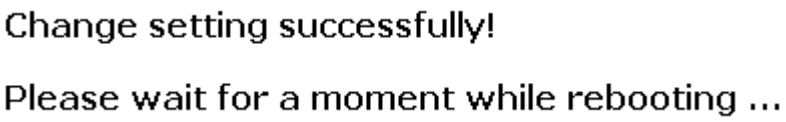
- If you want to use WPA2 (AES) - *Wi-Fi Protected Access 2 (AES) Passphrase encryption*, follow the instructions in *Configuring WPA2 (AES) Passphrase security*.
- If you want to use WPA2 (AES) - *Wi-Fi Protected Access 2 (AES) HEX (64 characters) encryption*, follow the instructions in *Configuring WPA2 (AES) HEX (64 characters) security*.
- If you want to use WPA2 Mixed- *Wi-Fi Protected Access 2 (Mixed) Passphrase encryption*, follow the instructions in *Configuring WPA2 (Mixed) Passphrase security*.
- If you want to use WPA2 Mixed- *Wi-Fi Protected Access 2 (Mixed) HEX (64 characters) encryption*, follow the instructions in *Configuring WPA2 (Mixed) HEX (64 characters) security*.

Configuring WEP 64bit ASCII (5 characters) security

The example set in this section is for 64bit encryption.

1. From the *Encryption* drop-down list, select *WEP* setting.
2. From the *Key Length* drop-down list, select *64-bit* setting.
3. From the *Key Format* drop-down list, select *ASCII (5 characters)* setting.
4. Type the *Key Setting*.
5. Click *Finished*.

6. Change setting successfully! Please wait for a moment while rebooting.

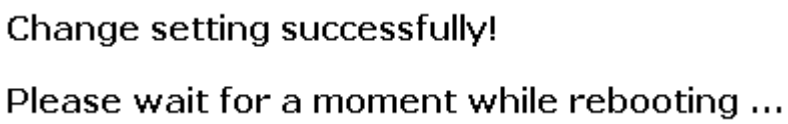


Configuring WEP 64bit Hex (10 characters) security

The example set in this section is for 64bit encryption.

1. From the *Encryption* drop-down list, select *WEP* setting.
2. From the *Key Length* drop-down list, select *64-bit* setting.
3. From the *Key Format* drop-down list, select *Hex (10 characters)* setting.
4. Type the *Key Setting*.
5. Click *Finished*.

6. Change setting successfully! Please wait for a moment while rebooting.

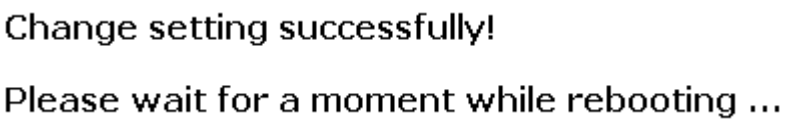


Configuring WEP 128bit ASCII (13 characters) security

The example set in this section is for 128bit encryption.

1. From the *Encryption* drop-down list, select *WEP* setting.
2. From the *Key Length* drop-down list, select *128-bit* setting.
3. From the *Key Format* drop-down list, select *ASCII (13 characters)* setting.
4. Type the *Key Setting*.
5. Click *Finished*.

6. Change setting successfully! Please wait for a moment while rebooting.

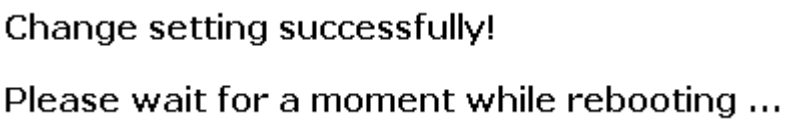


Configuring WEP 128bit Hex (26 characters) security

The example set in this section is for 128bit encryption.

1. From the *Encryption* drop-down list, select *WEP* setting.
2. From the *Key Length* drop-down list, select *128-bit* setting.
3. From the *Key Format* drop-down list, select *Hex (26 characters)* setting.
4. Type the *Key Setting*.
5. Click *Finished*.

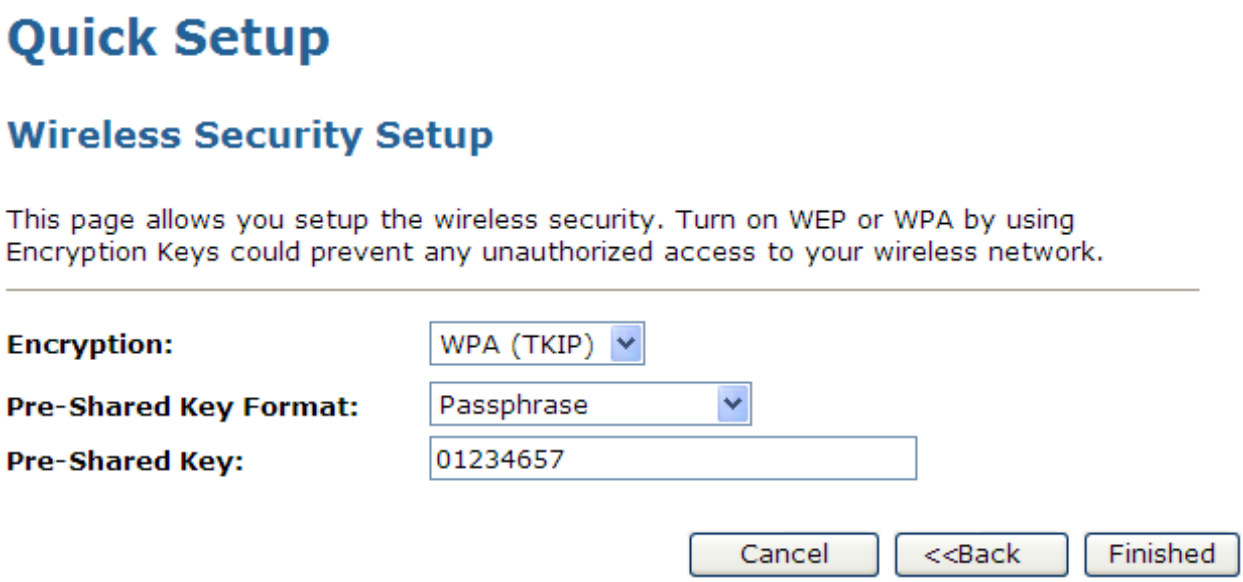
6. Change setting successfully! Please wait for a moment while rebooting.



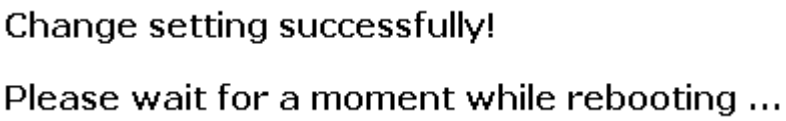
Configuring WPA (TKIP) Passphrase security

The example set in this section is for WPA (TKIP) Passphrase encryption.

1. From the *Encryption* drop-down list, select *WPA (TKIP)* setting.
2. From the *Pre-Shared Key Format* drop-down list, select *Passphrase* setting.
3. Type the *Pre-Shared Key*.
4. Click *Finished*.



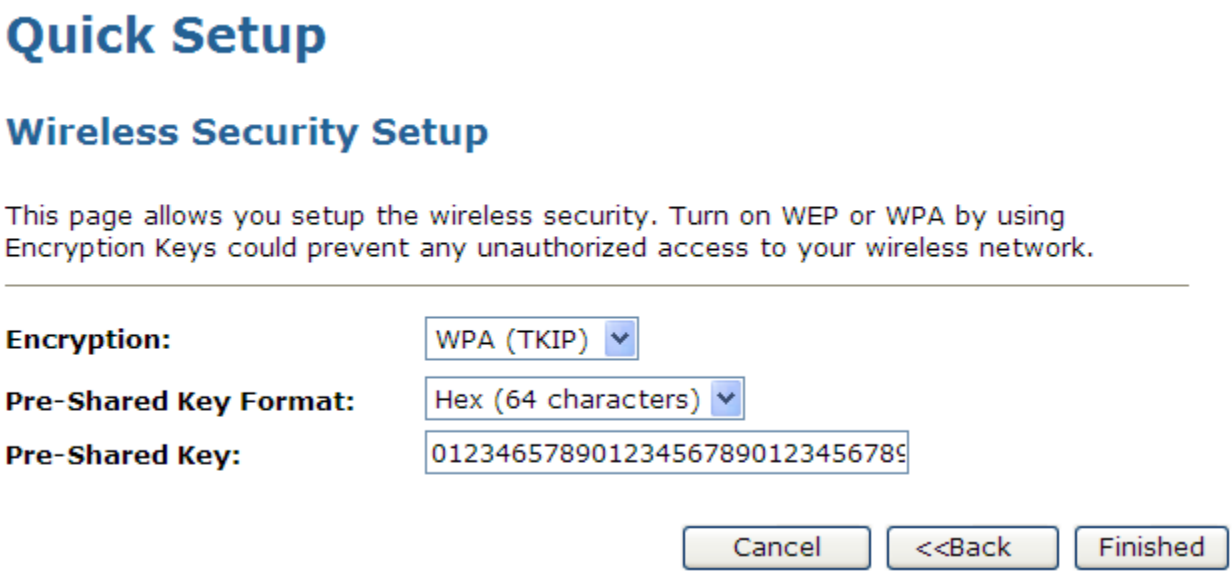
5. Change setting successfully! Please wait for a moment while rebooting.



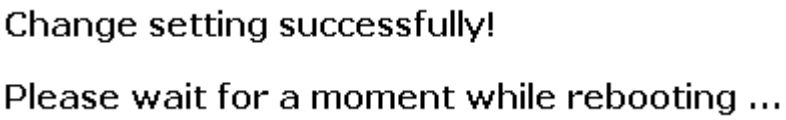
Configuring WPA (TKIP) HEX (64 characters) security

The example set in this section is for WPA (TKIP) HEX (64 characters) encryption.

1. From the *Encryption* drop-down list, select *WPA (TKIP)* setting.
2. From the *Pre-Shared Key Format* drop-down list, select *HEX (64 characters)* setting.
3. Type the *Pre-Shared Key*.
4. Click *Finished*.



5. Change setting successfully! Please wait for a moment while rebooting.

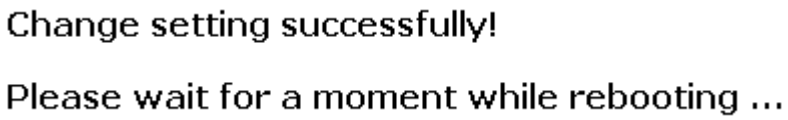


Configuring WPA2 (AES) Passphrase security

The example set in this section is for WPA2 (AES) Passphrase encryption.

1. From the *Encryption* drop-down list, select *WPA2 (AES)* setting.
2. From the *Pre-Shared Key Format* drop-down list, select *Passphrase* setting.
3. Type the *Pre-Shared Key*.
4. Click *Finished*.

5. Change setting successfully! Please wait for a moment while rebooting.

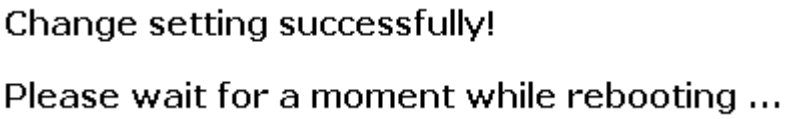


Configuring WPA2 (AES) HEX (64 characters) security

The example set in this section is for WPA2 (AES) HEX (64 characters) encryption.

1. From the *Encryption* drop-down list, select *WPA2 (AES)* setting.
2. From the *Pre-Shared Key Format* drop-down list, select *HEX (64 characters)* setting.
3. Type the *Pre-Shared Key*.
4. Click *Finished*.

5. Change setting successfully! Please wait for a moment while rebooting.



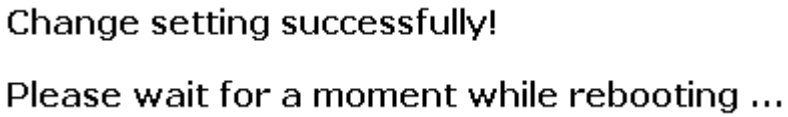
Configuring WPA2 (Mixed) Passphrase security

The example set in this section is for WPA2 (Mixed) Passphrase encryption.

The WPA2 (Mixed) Passphrase encryption supports both WPA (TKIP) and WPA2 (AES).

1. From the *Encryption* drop-down list, select *WPA2 (Mixed)* setting.
2. From the *Pre-Shared Key Format* drop-down list, select *Passphrase* setting.
3. Type the *Pre-Shared Key*.
4. Click *Finished*.

5. Change setting successfully! Please wait for a moment while rebooting.



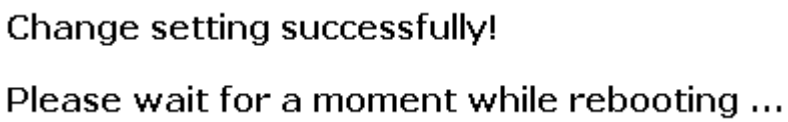
Configuring WPA2 (Mixed) HEX (64 characters) security

The example set in this section is for WPA2 (Mixed) HEX (64 characters) encryption.

The WPA2 (Mixed) HEX (64 characters) encryption supports both WPA (TKIP) and WPA2 (AES).

1. From the *Encryption* drop-down list, select *WPA2 (Mixed)* setting.
2. From the *Pre-Shared Key Format* drop-down list, select *HEX (64 characters)* setting.
3. Type the *Pre-Shared Key*.
4. Click *Finished*.

5. Change setting successfully! Please wait for a moment while rebooting.



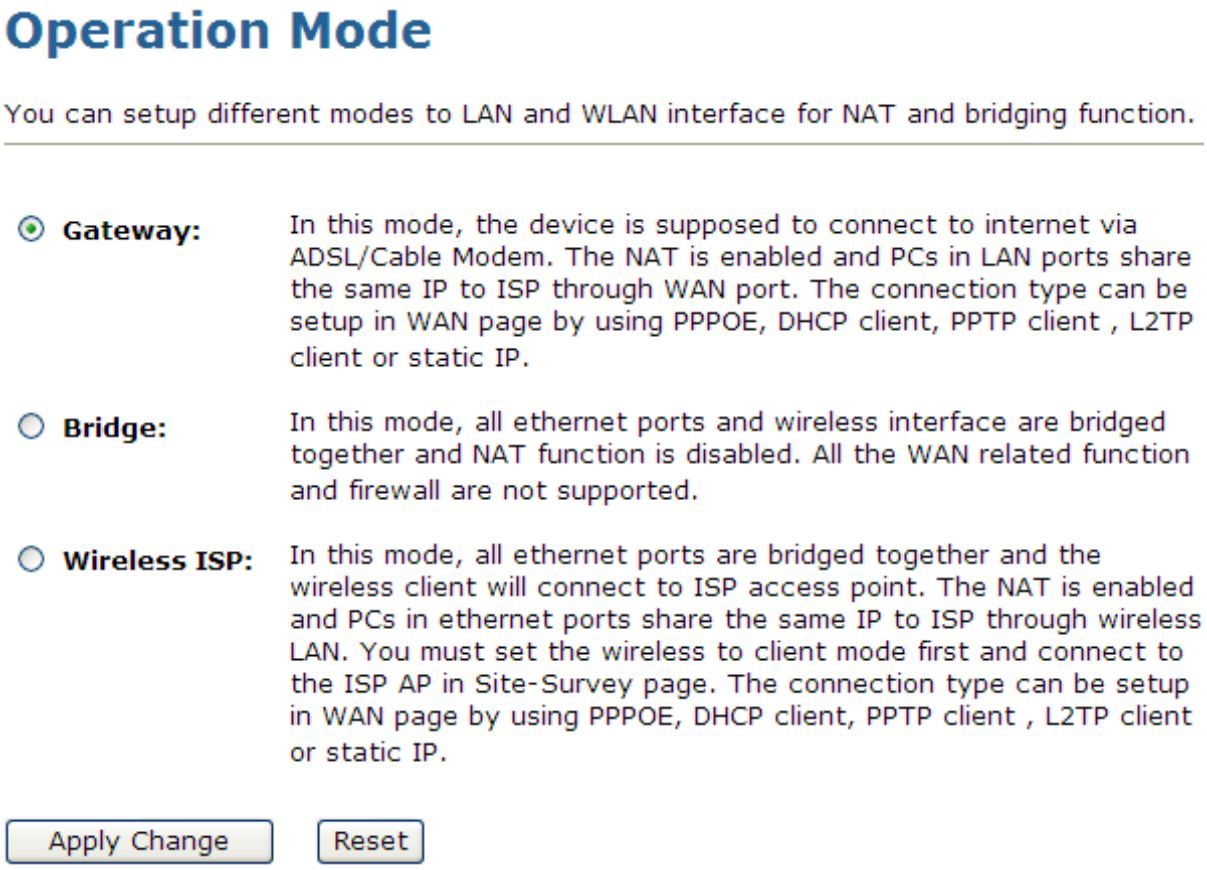
9. Operation Mode

This chapter describes how to configure the way that your device connects to the Internet. There are three options of Operation Mode: Gateway, Bridge and Wireless ISP.

9.1 Setting Operation Mode

To change the Operation Mode:

1. From the left-hand *Operation Mode* menu. The following page is displayed:
2. Click on the ratio of *Gateway*, *Bridge* or *Wireless ISP* and then click on *Apply* to active it.



10. Wireless Network

This chapter assumes that you have already set up your Wireless PCs and installed a compatible Wireless card on your device. See *Configuring Wireless PCs*.

10.1 Basic Settings

The *Wireless Network* page allows you to configure the Wireless features of your device. To access the *Wireless Network Basic Settings* page:

From the left-hand *Wireless* menu, click on *Basic Settings*. The following page is displayed:

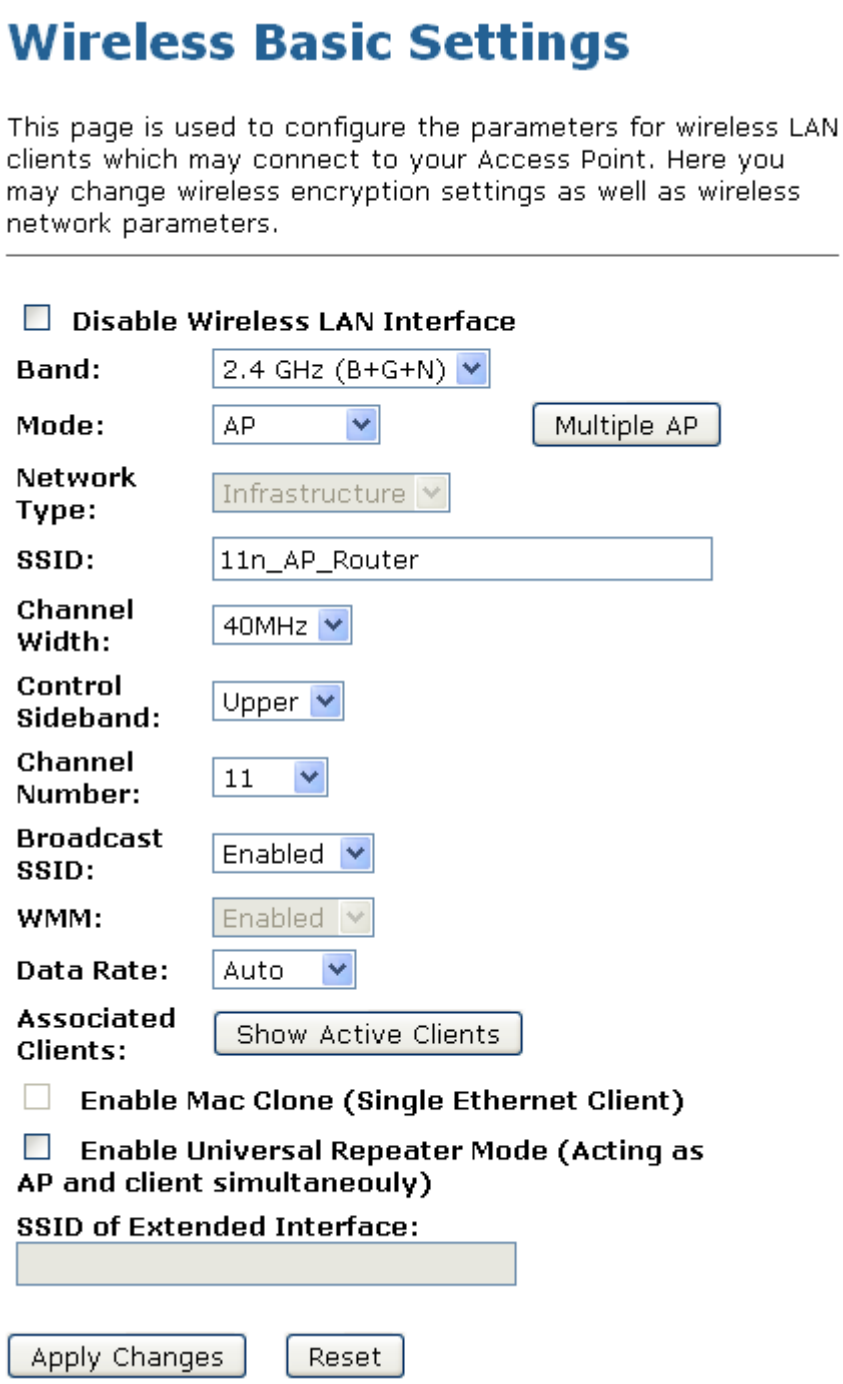


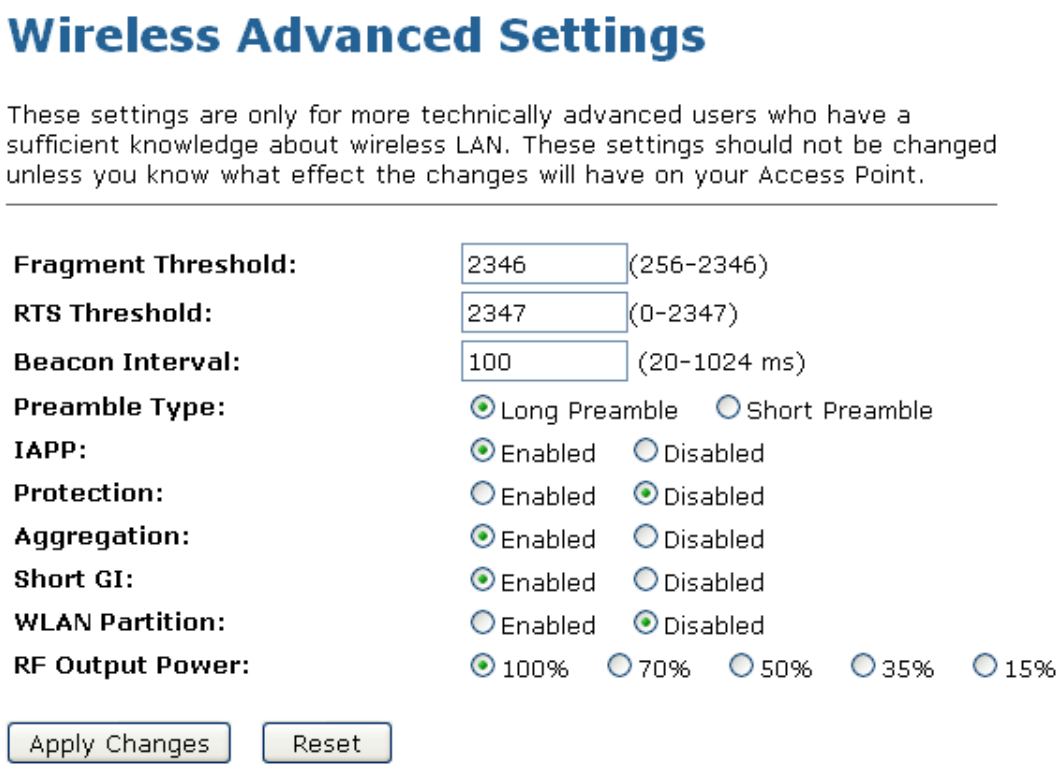
Figure 2: Wireless Network page

Field	Description
Disable Wireless LAN Interface	**Enable/Disable the Wireless LAN Interface.** **Default: Disable**
Band	**Specify the WLAN Mode to 802.11b/g Mixed mode, 802.11b mode or 802.11g mode**
Mode	**Configure the Wireless LAN Interface to AP, Client, WDS, AP + WDS, MESH or AP + MESH mode**
Network Type	**Configure the Network Type to Infrastructure or Ad hoc.**
SSID	**Specify the network name.** **Each Wireless LAN network uses a unique Network Name to identify the network. This name is called the Service Set Identifier (SSID). When you set up your wireless adapter, you specify the SSID. If you want to connect to an existing network, you must use the name for that network. If you are setting up your own network you can make up your own name and use it on each computer. The name can be up to 20 characters long and contain letters and numbers.**
Channel Width	**Choose a Channel Width from the pull-down menu.**
Control Sideband	**Choose a Control Sideband from the pull-down menu.**
Channel Number	**Choose a Channel Number from the pull-down menu.**
Broadcast SSID	**Broadcast or Hide SSID to your Network.** **Default: Enabled**
WMM	**Enable/disable the Wi-Fi Multimedia (WMM) support.**
Data Rate	**Select the Data Rate from the drop-down list**
Associated Clients	**Show Active Wireless Client Table** **This table shows the MAC address, transmission, receiption packet counters and encrypted status for each associated wireless client.**
Enable Mac Clone (Single Ethernet Client)	**Enable Mac Clone (Single Ethernet Client)**
Enable Universal Repeater Mode	**Acting as AP and client simultaneously**
SSID of Extended Interface	**When mode is set to "AP" and URM (Universal Repeater Mode) is enabled, user should input SSID of another AP in the field of "SSID of Extended Interface". Please note, the channel number should be set to the one, used by another AP because 8186 will share the same channel between AP and URM interface (called as extended interface hereafter).**

10.2 Advanced Settings

These settings are only for more technically advanced users who have a sufficient knowledge about wireless LAN. These settings should not be changed unless you know what effect the changes will have on your Access Point. To access the *Wireless Network Advanced Settings* page:

From the left-hand *Wireless* menu, click on *Advanced Settings*. The following page is displayed:



Field	Description
Fragment Threshold	**When transmitting a packet over a network medium, sometimes the packet is broken into several segments, if the size of packet exceeds that allowed by the network medium.** **The Fragmentation Threshold defines the number of bytes used for the fragmentation boundary for directed messages.**
RTS Threshold	**RTS stands for "Request to Send". This parameter controls what size data packet the low level RF protocol issues to an RTS packet. The default is 2347.**
Beacon Interval	**Choosing beacon period for improved response time for wireless http clients.**
Preamble Type	**Specify the Preamble type is short preamble or long preamble**
IAPP	**Disable or Enable IAPP**
Protection	**A protection mechanism prevents collisions among 802.11g nodes.**
RF Output Power	**TX Power measurement.**

10.3 Security

This page allows you setup the wireless security. Turn on WEP or WPA by using Encryption Keys could prevent any unauthorized access to your wireless network. To access the *Wireless Network Security* page:

From the left-hand *Wireless* menu, click on *Security*. The following page is displayed:

Field	Description
Select SSID	**Select the SSID**
Encryption	**Configure the Encryption to Disable, WEP, WPA , WPA2 or WPA-Mixed**
Use 802.1x Authentication	**Use 802.1x Authentication by WEP 64bits or WEP 128bits**
Authentication	**Configure the Authentication Mode to Open System, Shared Key or Auto**
Key Length	**Select the Key Length 64-bit or 128-bit**
Key Format	**Select the Key Format ASCII (5 characters), Hex (10 characters), ASCII (13 characters) or Hex (26 characters)**
Encryption Key	**Enter the Encryption Key**
WPA Authentication Mode	**Configure the WPA Authentication Mode to Enterprise (RADIUS) or Personal (Pre-Shared Key)**
WPA Cipher Suite	**Configure the WPA Cipher Suite to TKIP and/or AES**

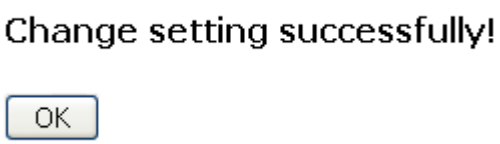
Field	Description
WPA2 Cipher Suite	**Configure the WPA2 Cipher Suite to TKIP and/or AES**
Pre-Shared Key Format	**Configure the Pre-Shared Key Format to Passphrase or HEX (64 characters)**
Pre-Shared Key	**Type the Pre-Shared Key**
Enable Pre-Authentication	**According to some of the preferred embodiments, a method for proactively establishing a security association between a mobile node in a visiting network and an authentication agent in another network to which the mobile node can move includes: negotiating pre-authentication using a flag in a message header that indicates whether the communication is for establishing a pre-authentication security association; and one of the mobile node and the authentication agent initiating pre-authentication by transmitting a message with the flag set in its message header, and the other of the mobile node and the authentication agent responding with the flag set in its message header only if it supports the pre-authentication. Enable/disable pre-authentication support. Default: disable.**
Authentication RADIUS Server	**Port: Type the port number of RADIUS Server** **IP address: Type the IP address of RADIUS Server** **Password: Type the Password of RADIUS Server**

WEP + Encryption Key

WEP aims to provide security by encrypting data over radio waves so that it is protected as it is transmitted from one end point to another. However, it has been found that WEP is not as secure as once believed.

1. From the *Encryption* drop-down list, select *WEP* setting.
2. From the *Key Length* drop-down list, select *64-bit* or *128-bit* setting.
3. From the *Key Format* drop-down list, select *ASCII (5 characters), Hex (10 characters), ASCII (13 characters)* or *Hex (26 characters)* setting.
4. Enter the *Encryption Key* value depending on selected ASCII or Hexadecimal.
5. Click *Apply Changes* button.

6. Change setting successfully! Click on *OK* button to confirm and return.



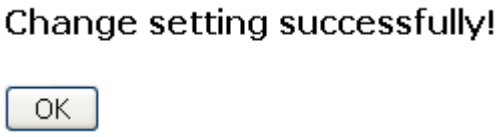
WEP + Use 802.1x Authentication

WEP aims to provide security by encrypting data over radio waves so that it is protected as it is transmitted from one end point to another. However, it has been found that WEP is not as secure as once believed.

1. From the *Encryption* drop-down list, select *WEP* setting.
2. Check the option of *Use 802.1x Authentication.*
3. Click on the ratio of *WEP 64bits* or *WEP 128bits*.
4. Enter the *Port*, *IP Address* and *Password* of RADIUS Server:

5. Click *OK* button.

6. Change setting successfully! Click on *OK* button to confirm and return.

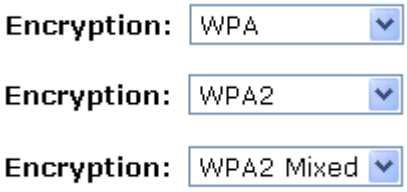


WPA/WPA2/WPA2 Mixed + Personal (Pre-Shared Key)

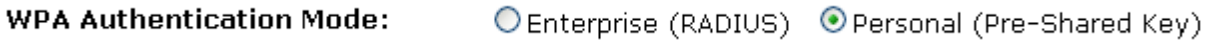
Wi-Fi Protected Access (WPA and WPA2) is a class of systems to secure wireless (Wi-Fi) computer networks. WPA is designed to work with all wireless network interface cards, but not necessarily with first generation wireless access points. WPA2 implements the full standard, but will not work with some older network cards. Both provide good security, with two significant issues:

- Either WPA or WPA2 must be enabled and chosen in preference to WEP. WEP is usually presented as the first security choice in most installation instructions.
- In the "Personal" mode, the most likely choice for homes and small offices, a pass phrase is required that, for full security, must be longer than the typical 6 to 8 character passwords users are taught to employ.

1. From the *Encryption* drop-down list, select *WPA, WPA2* or *WPA2 Mixed* setting.



2. Click on the ratio of *Personal (Pre-Shared Key)*.

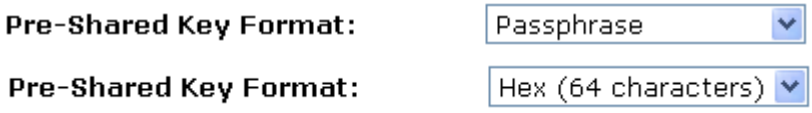


3. Check the option of *TKIP* and/or *AES* in *WPA Cipher Suite* if your Encryption is *WPA*:

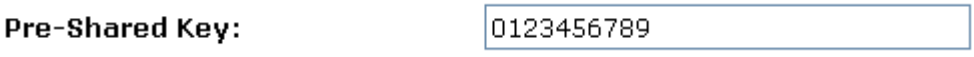
4. Check the option of *TKIP* and/or *AES* in *WPA2 Cipher Suite* if your Encryption is *WPA2*:

5. Check the option of *TKIP* and/or *AES* in *WPA/WPA2 Cipher Suite* if your Encryption is *WPA2 Mixed*:

6. From the *Pre-Shared Key Format* drop-down list, select *Passphrase* or *Hex (64 characters)* setting.

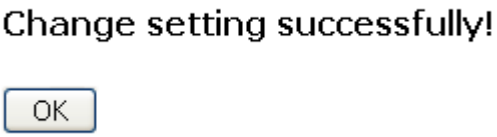


7. Enter the *Pre-Shared Key* depending on selected *Passphrase* or *Hex (64 characters)*.



8. Click on *Apply Changes* button to confirm and return.

9. Change setting successfully! Click on *OK* button to confirm and return.

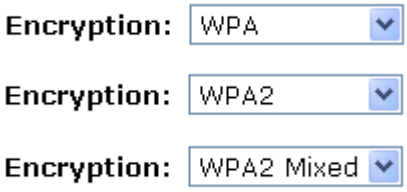


WPA/WPA2/WPA2 Mixed + Enterprise (RADIUS)

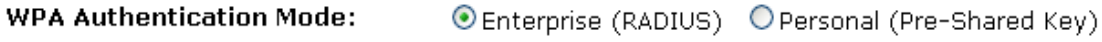
Wi-Fi Protected Access (WPA and WPA2) is a class of systems to secure wireless (Wi-Fi) computer networks. WPA is designed to work with all wireless network interface cards, but not necessarily with first generation wireless access points. WPA2 implements the full standard, but will not work with some older network cards. Both provide good security, with two significant issues:

- Either WPA or WPA2 must be enabled and chosen in preference to WEP. WEP is usually presented as the first security choice in most installation instructions.
- In the "Personal" mode, the most likely choice for homes and small offices, a pass phrase is required that, for full security, must be longer than the typical 6 to 8 character passwords users are taught to employ.

1. From the *Encryption* drop-down list, select *WPA, WPA2* or *WPA2 Mixed* setting.



2. Click on the ratio of *Enterprise (RADIUS)*.



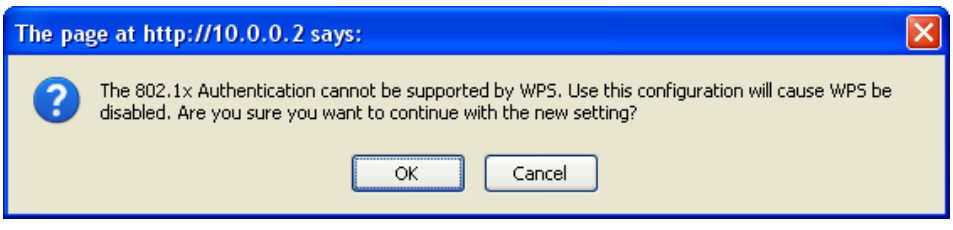
3. Check the option of *TKIP* and/or *AES* in *WPA Cipher Suite* if your Encryption is *WPA*:

4. Check the option of *TKIP* and/or *AES* in *WPA2 Cipher Suite* if your Encryption is *WPA2*:

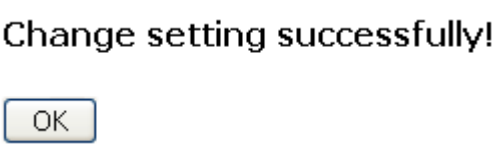
5. Check the option of *TKIP* and/or *AES* in *WPA/WPA2 Cipher Suite* if your Encryption is *WPA2 Mixed*:

6. Enter the *Port*, *IP Address* and *Password* of RADIUS Server:

7. Click *OK* button.



8. Change setting successfully! Click on *OK* button to confirm and return.



10.4 Access Control

For security reason, using MAC ACL's (MAC Address Access List) creates another level of difficulty to hacking a network. A MAC ACL is created and distributed to AP so that only authorized NICs can connect to the network. While MAC address spoofing is a proven means to hacking a network this can be used in conjunction with additional security measures to increase the level of complexity of the network security decreasing the chance of a breach.

MAC addresses can be add/delete/edit from the ACL list depending on the MAC Access Policy.

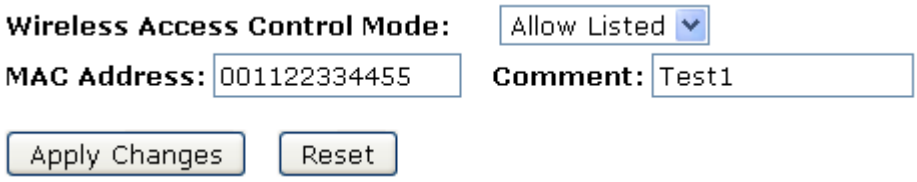
If you choose 'Allowed Listed', only those clients whose wireless MAC addresses are in the access control list will be able to connect to your Access Point. When 'Deny Listed' is selected, these wireless clients on the list will not be able to connect the Access Point. To access the *Wireless Network Access Control* page:

From the left-hand *Wireless* menu, click on *Access Control*. The following page is displayed:

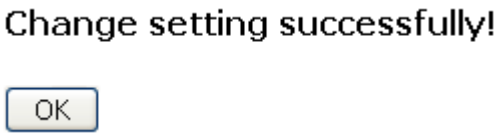
Allow Listed

If you choose 'Allowed Listed', only those clients whose wireless MAC addresses are in the access control list will be able to connect to your Access Point.

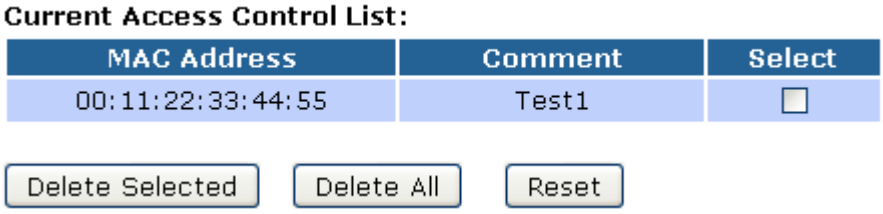
1. From the *Wireless Access Control Mode* drop-down list, select *Allowed Listed* setting.
2. Enter the *MAC Address*.
3. Enter the *Comment*.
4. Click *Apply Changes* button.



5. Change setting successfully! Click on *OK* button to confirm and return.



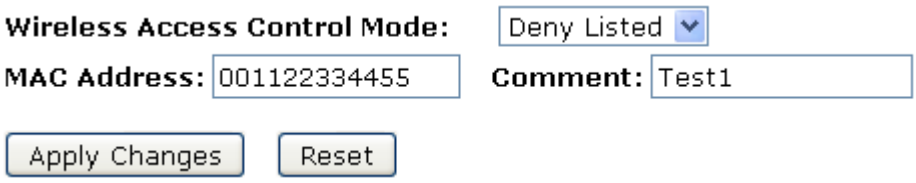
6. The MAC Address that you created has been added in the *Current Access Control List*.



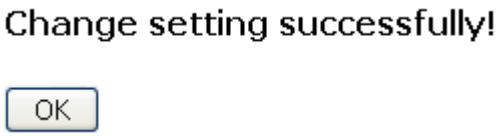
Deny Listed

When 'Deny Listed' is selected, these wireless clients on the list will not be able to connect the Access Point.

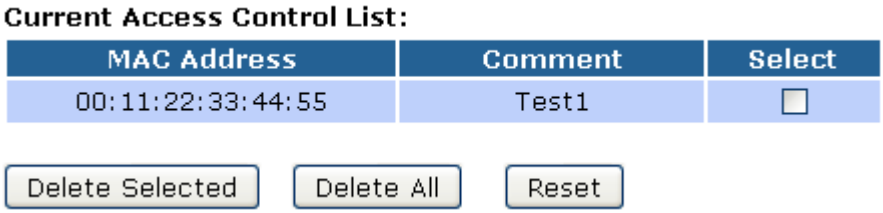
1. From the Wireless Access Control Mode drop-down list, select *Deny Listed* setting.
2. Enter the *MAC Address*.
3. Enter the *Comment*.
4. Click *Apply Changes* button.



5. Change setting successfully! Click on *OK* button to confirm and return.



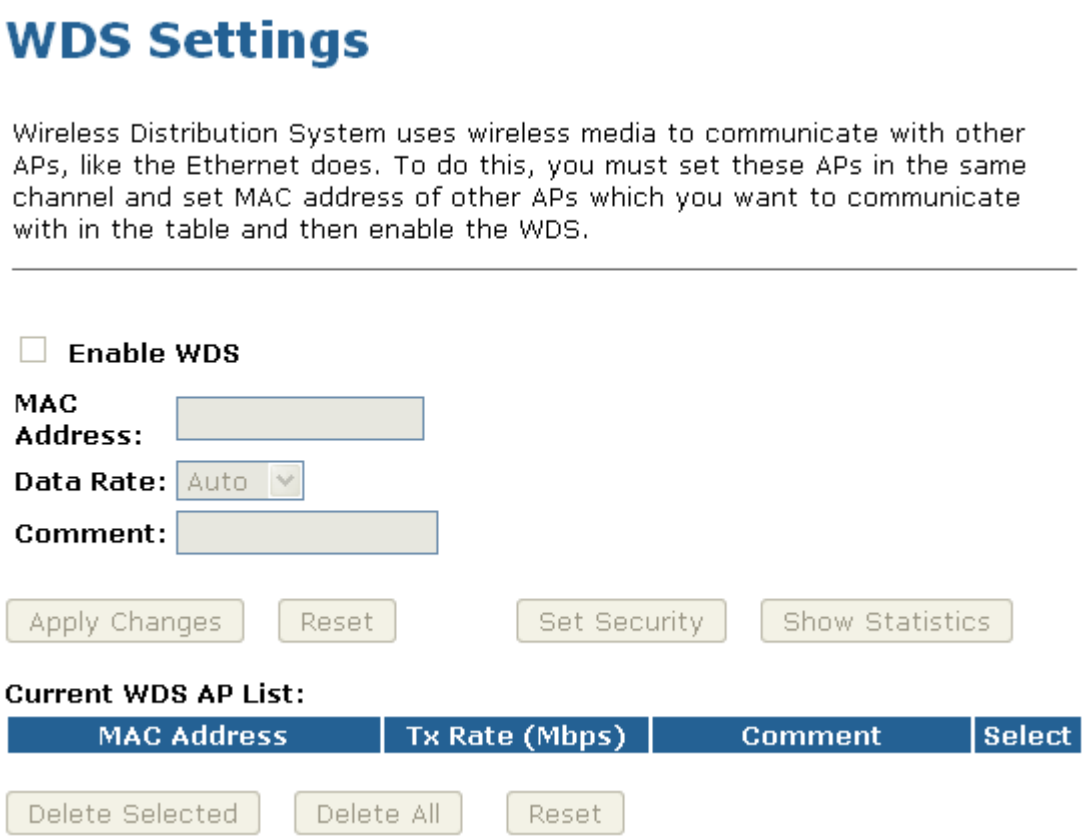
6. The MAC Address that you created has been added in the *Current Access Control List*.



10.5 WDS settings

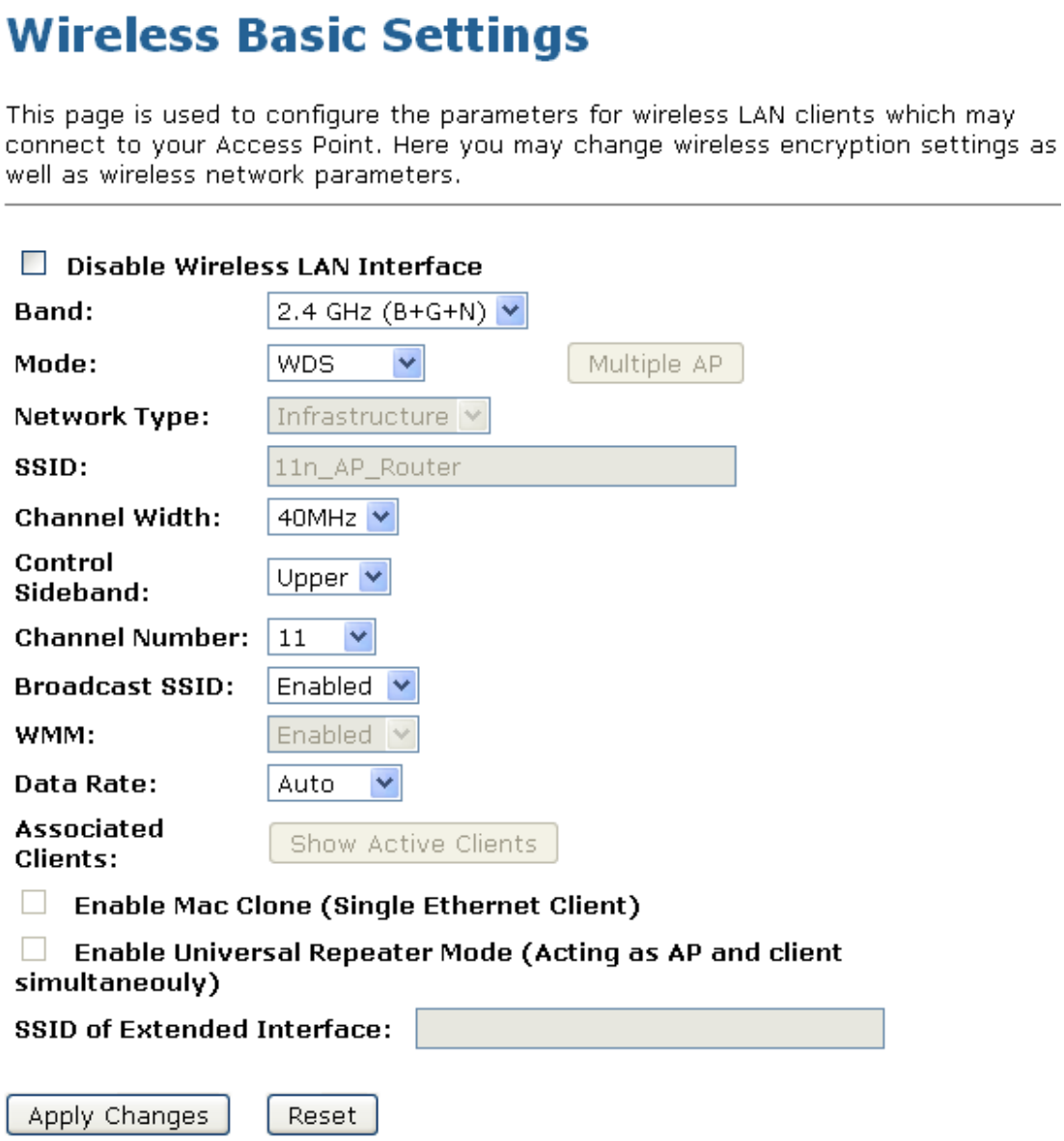
Wireless Distribution System uses wireless media to communicate with other APs, like the Ethernet does. To do this, you must set these APs in the same channel and set MAC address of other APs which you want to communicate with in the table and then enable the WDS. To access the *Wireless Network WDS settings* page:

From the left-hand *Wireless* menu, click on *WDS settings*. The following page is displayed:

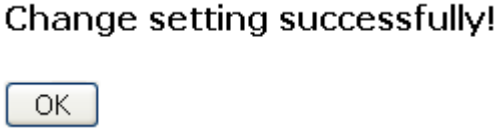


Configure WDS (Wireless Distribution System) only

1. From the left-hand *Wireless* menu, click on *Basic Settings*.
2. From the *Mode* drop-down list, select *WDS*.
3. From the *Channel Number* drop-down list, select a Channel.
4. Click *Apply Changes* button.

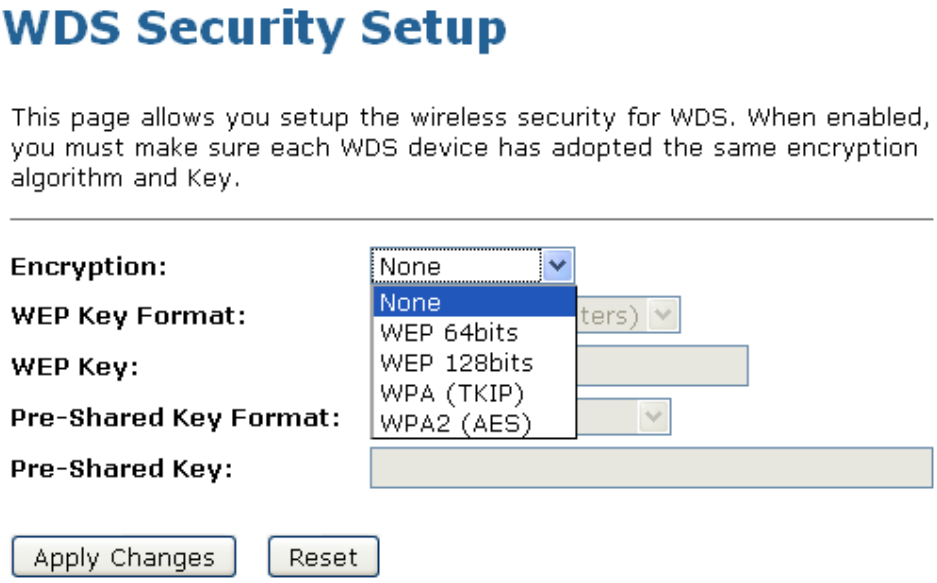


7. Change setting successfully! Click on *OK* button to confirm and return.

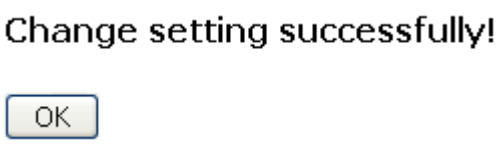


8. From the left-hand *Wireless* menu, click on *WDS settings*.
9. Check on the option *Enable WDS*.
10. Enter the *MAC Address*.
11. Enter the *Comment*.
12. Click the *Set Security*.

13. This page allows you setup the wireless security for WDS. When enabled, you must make sure each WDS device has adopted the same encryption algorithm and Key.
14. Configure each field with the *Encryption* that you selected.
15. Click *Apply Changes* button.

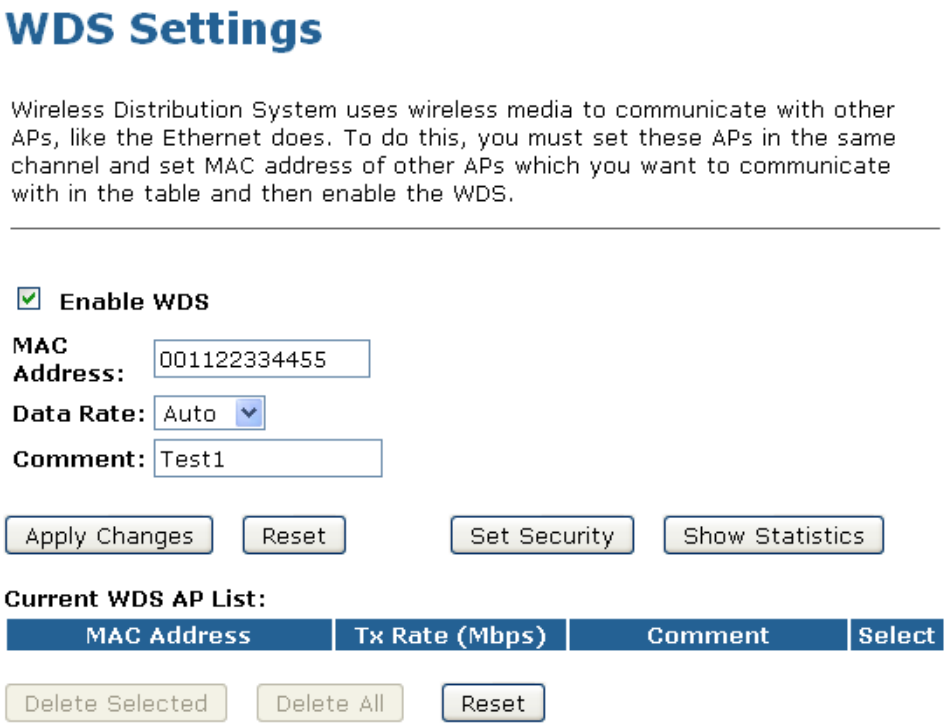


16. Change setting successfully! Click on *OK* button to confirm and return.



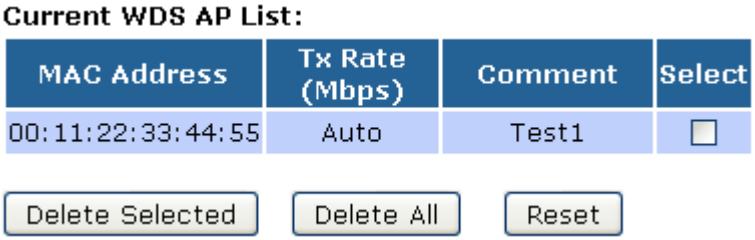
17. Click *Close* button to close and exit the *WDS Security Setup*.

18. Click *Apply Changes* button.



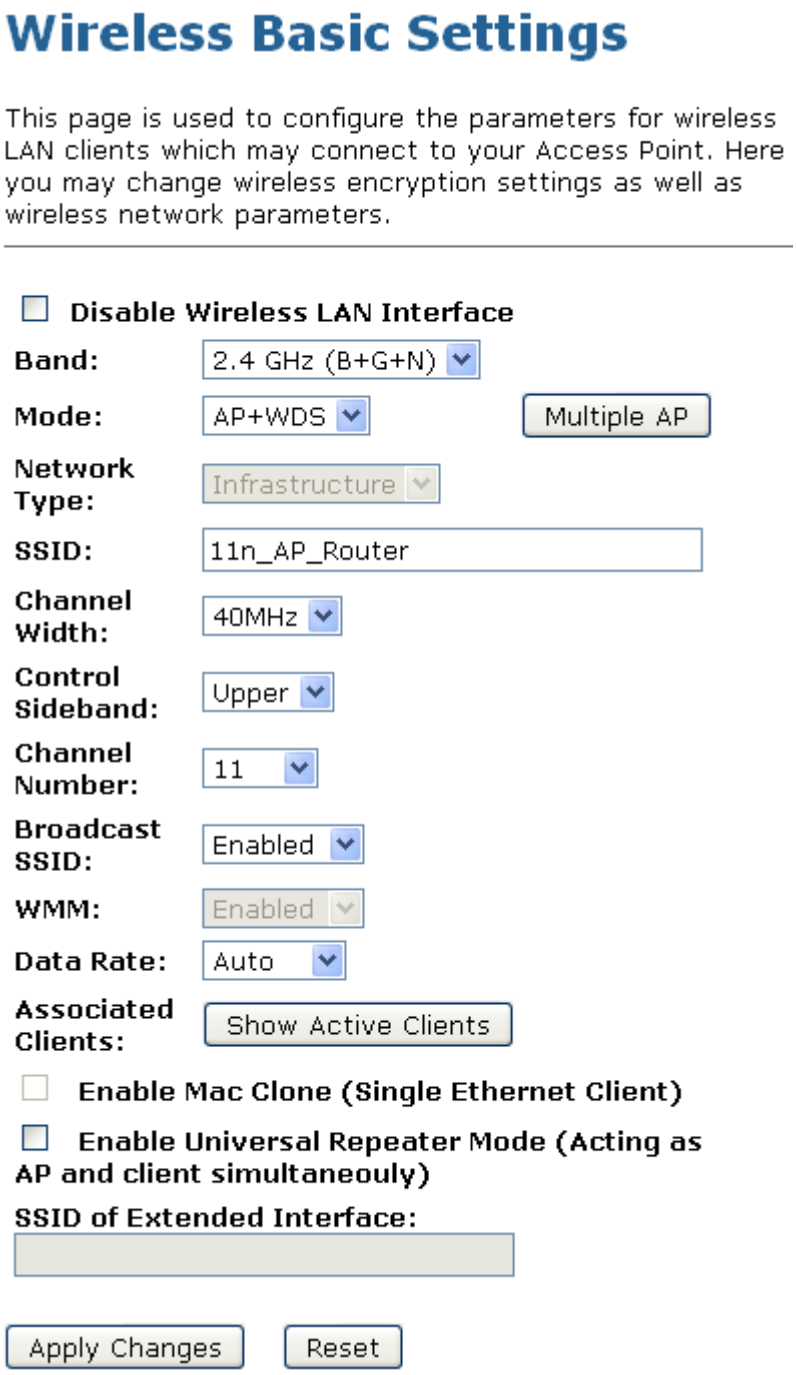
19. Change setting successfully! Click on *OK* button to confirm and return.

20. The MAC Address that you created has been added in the *Current Access Control List*.

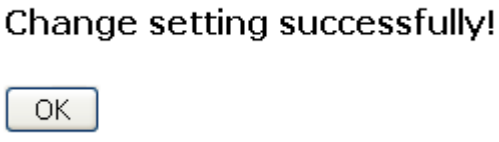


Configure AP (Access Point) + WDS (Wireless Distribution System)

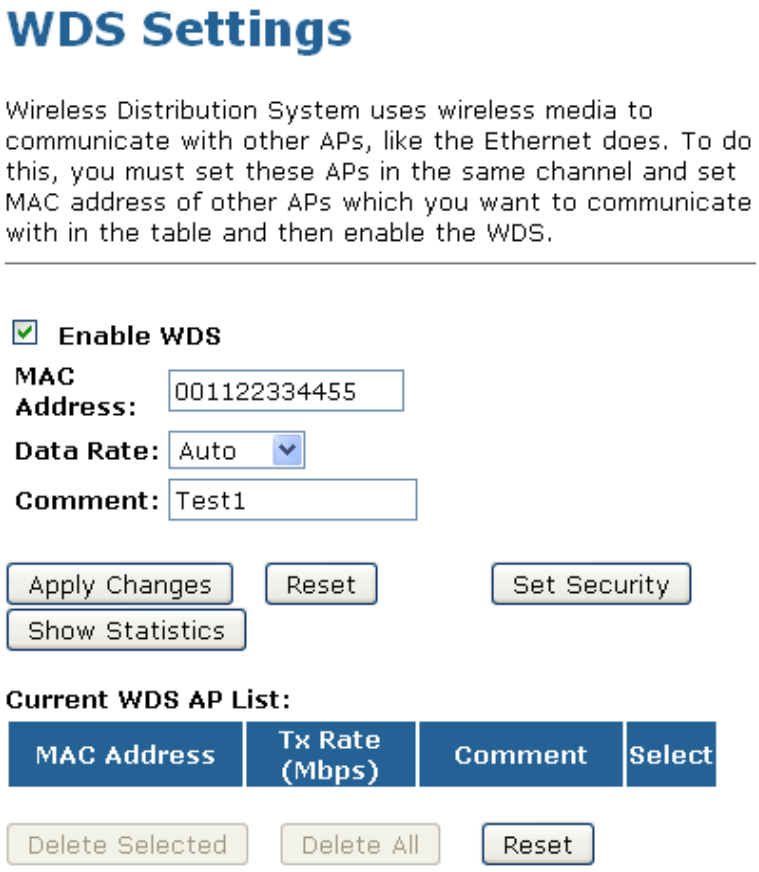
1. From the left-hand *Wireless* menu, click on *Basic Settings*.
2. From the *Mode* drop-down list, select *AP+WDS.*
3. Enter *SSID* for example 11n_AP_Router.
4. From the *Channel Number* drop-down list, select a Channel.
5. Click *Apply Changes* button.



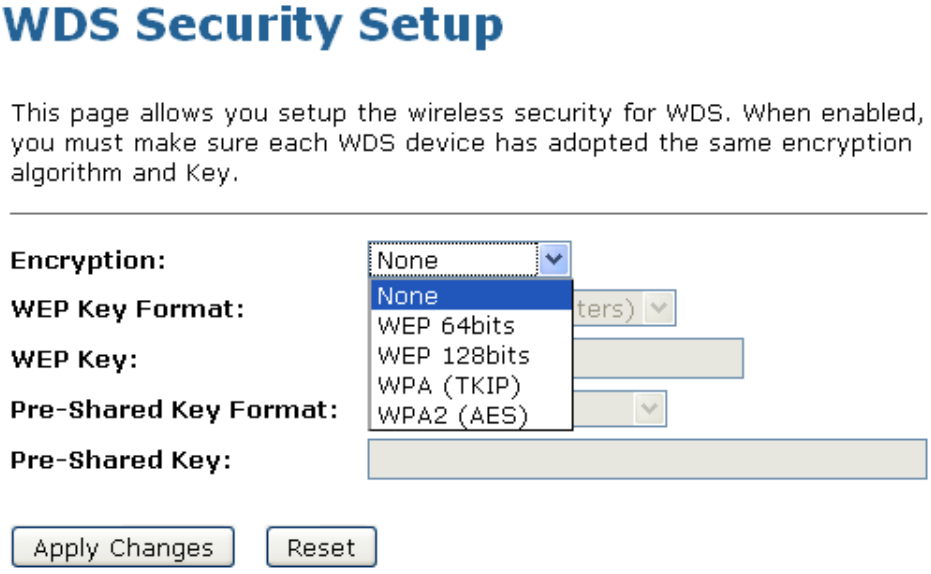
6. Change setting successfully! Click on *OK* button to confirm and return.



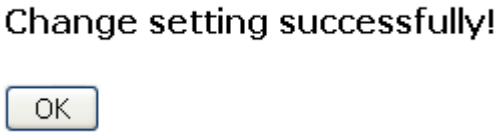
7. From the left-hand *Wireless* menu, click on *WDS settings*.
8. Check on the option *Enable WDS*.
9. Enter the *MAC Address*.
10. Enter the *Comment*.
11. Click the Set Security.



12. This page allows you setup the wireless security for WDS. When enabled, you must make sure each WDS device has adopted the same encryption algorithm and Key.
13. Configure each field with the *Encryption* that you selected.
14. Click *Apply Changes* button.

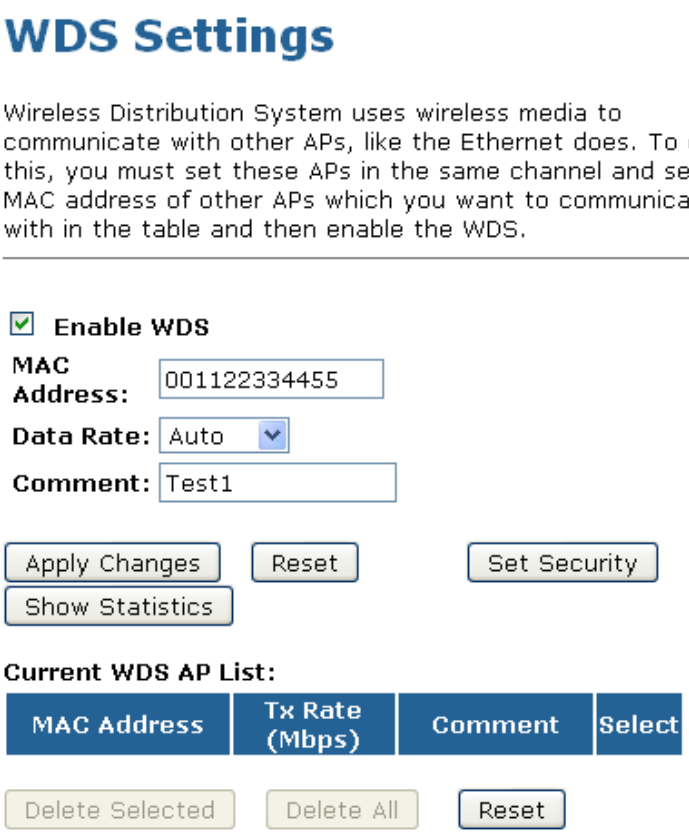


15. Change setting successfully! Click on *OK* button to confirm and return.

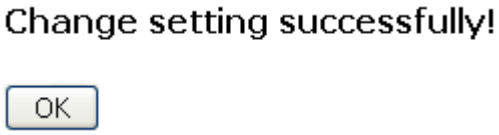


16. Click *Close* button to close and exit the *WDS Security Setup*.

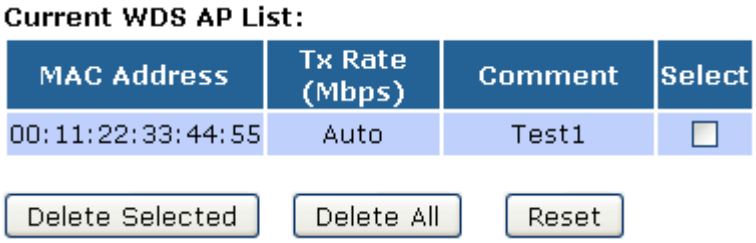
17. Click *Apply Changes* button.



18. Change setting successfully! Click on *OK* button to confirm and return.



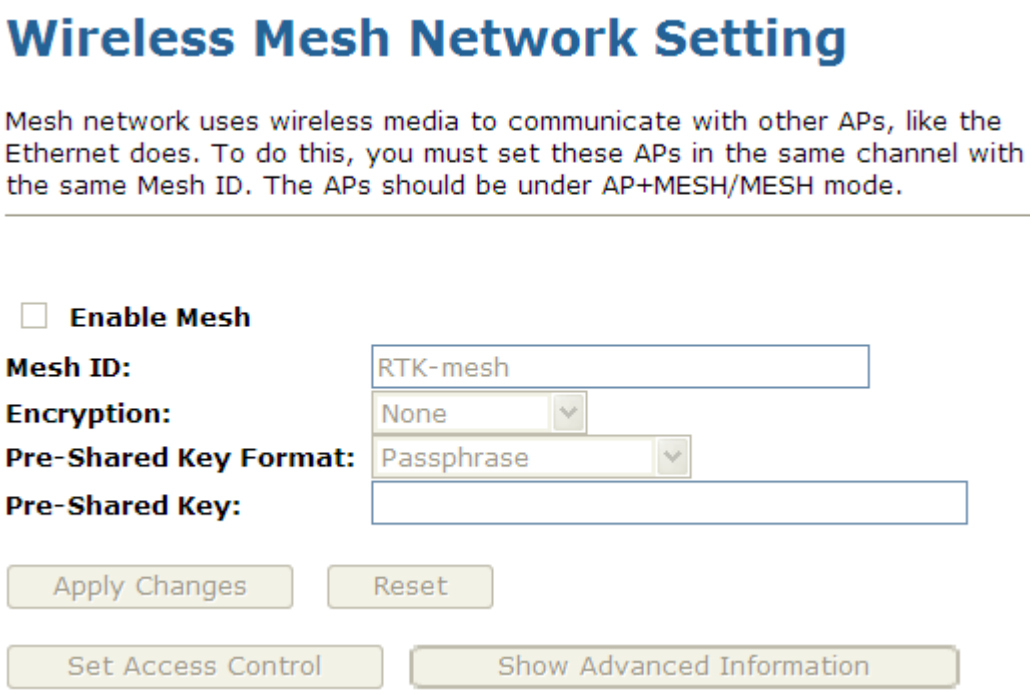
19. The MAC Address that you created has been added in the *Current Access Control List*.



10.6 Mesh settings

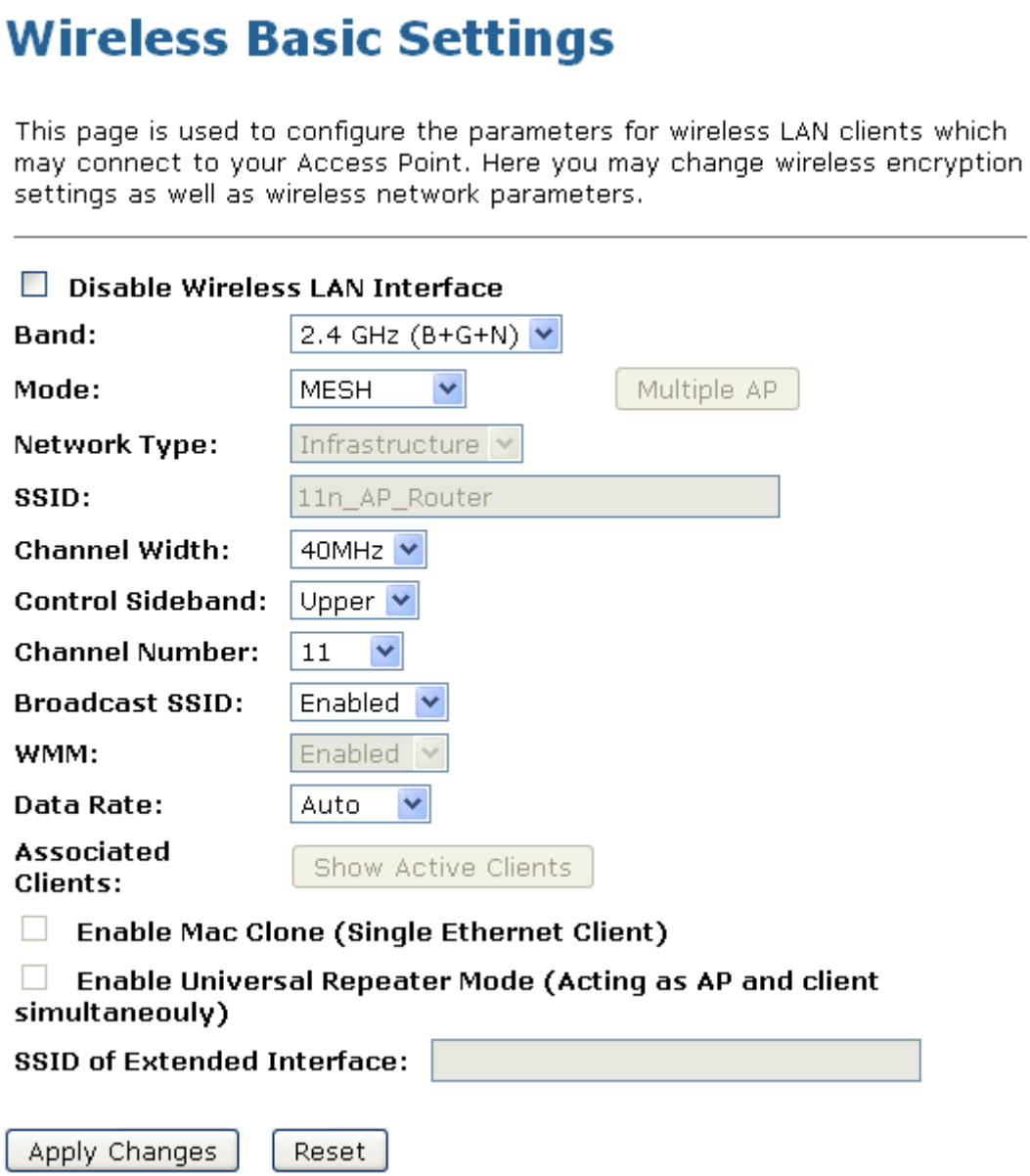
Mesh network uses wireless media to communicate with other APs, like the Ethernet does. To do this, you must set these APs in the same channel with the same Mesh ID. The APs should be under AP+MESH/MESH mode. To access the *Wireless Mesh Network Setting* page:

From the left-hand *Wireless* menu, click on *Mesh settings*. The following page is displayed:

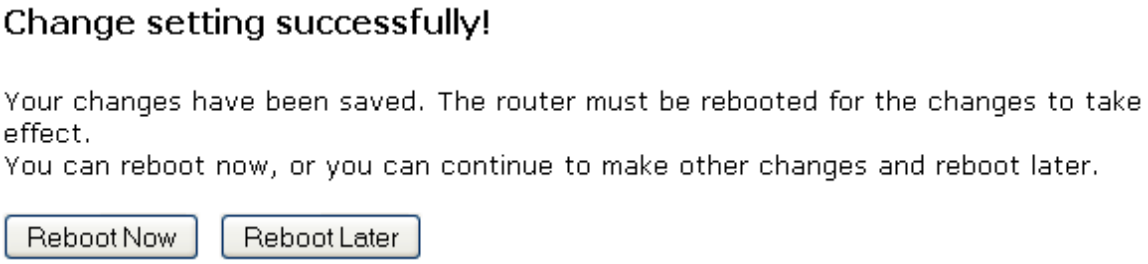


Configure Mesh settings only

1. From the left-hand *Wireless* menu, click on *Basic Settings*.
2. From the *Mode* drop-down list, select *MESH.*
3. From the *Channel Number* drop-down list, select a Channel.
4. Click *Apply Changes* button.

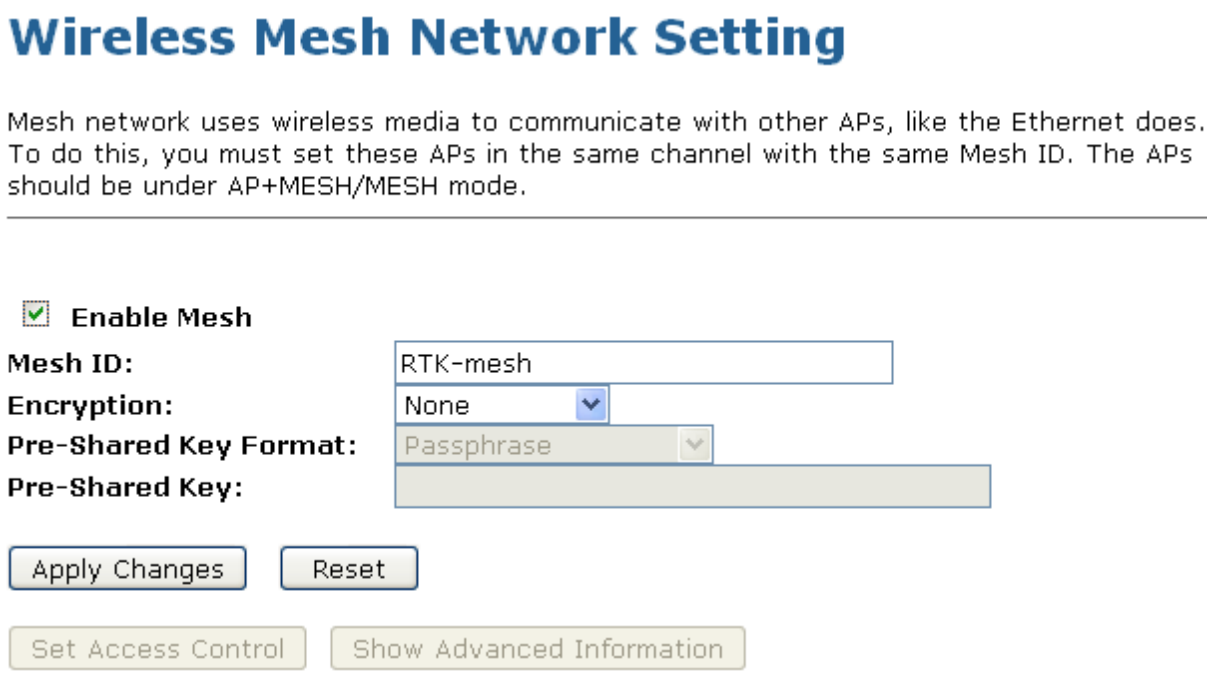


5. Change setting successfully! Click on *Reboot Now* button to confirm take effect.

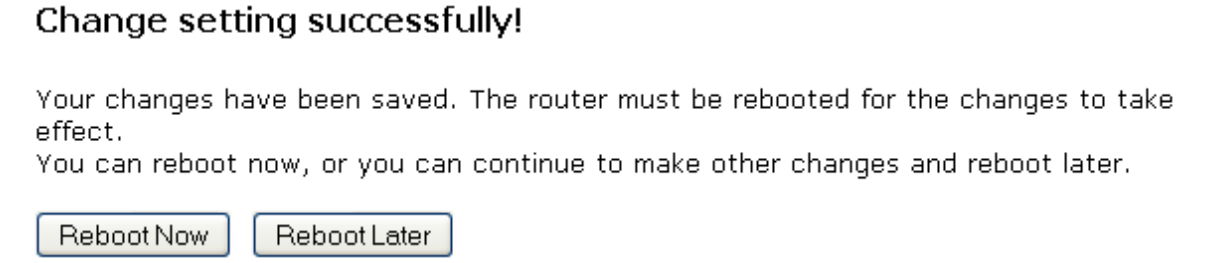


6. From the left-hand *Wireless* menu, click on *Mesh settings*.

7. Check on the option *Enable Mesh*.
8. Enter the *Mesh ID*.
9. From the *Encryption* drop-down list, select the one and configure related settings.
10. Click the Apply Changes.

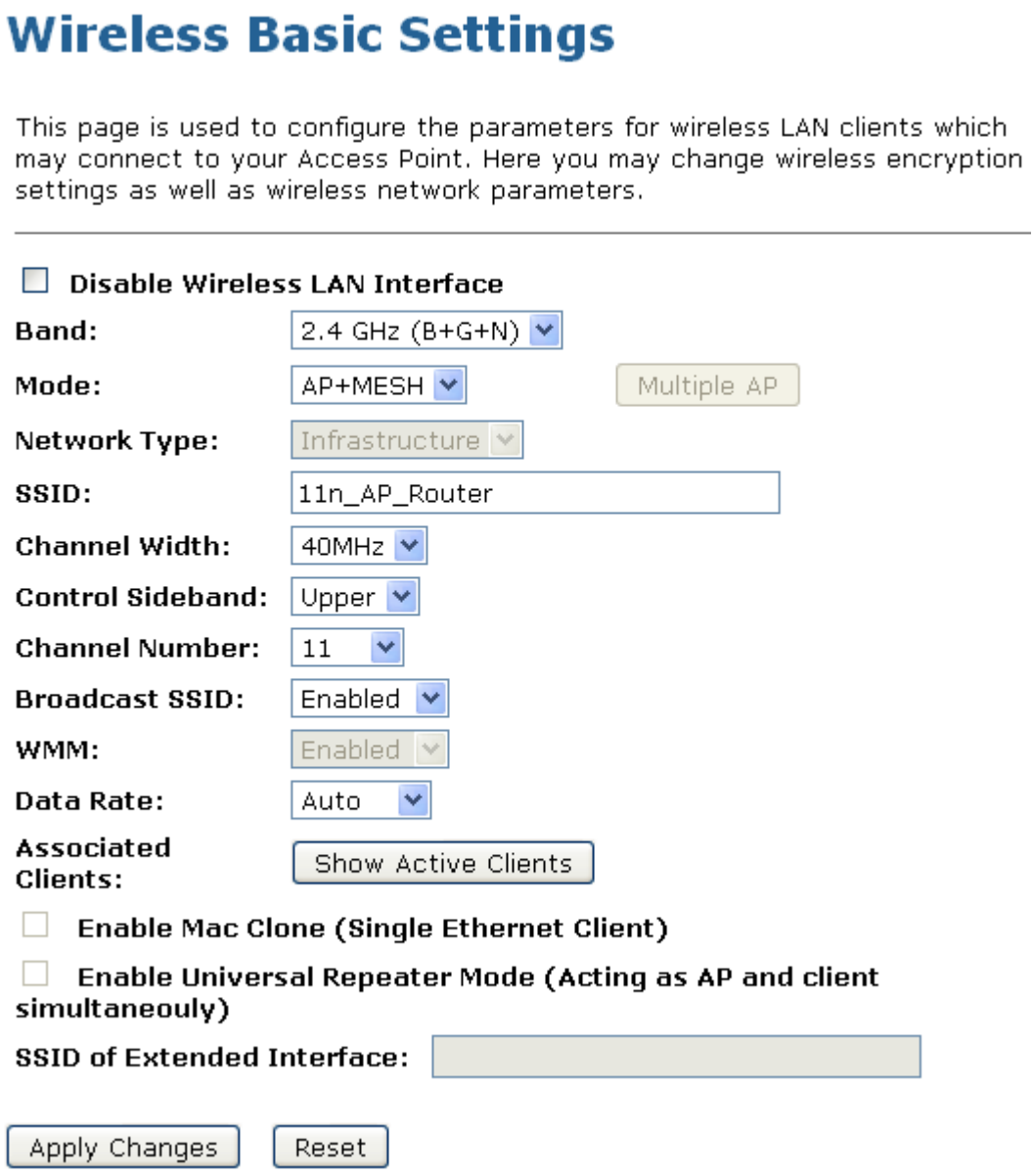


11. Change setting successfully! Click on *Reboot Now* button to confirm take effect.

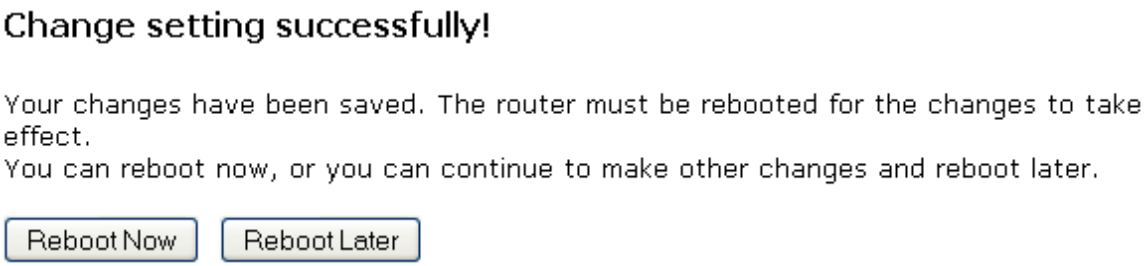


Configure AP (Access Point) + MESH

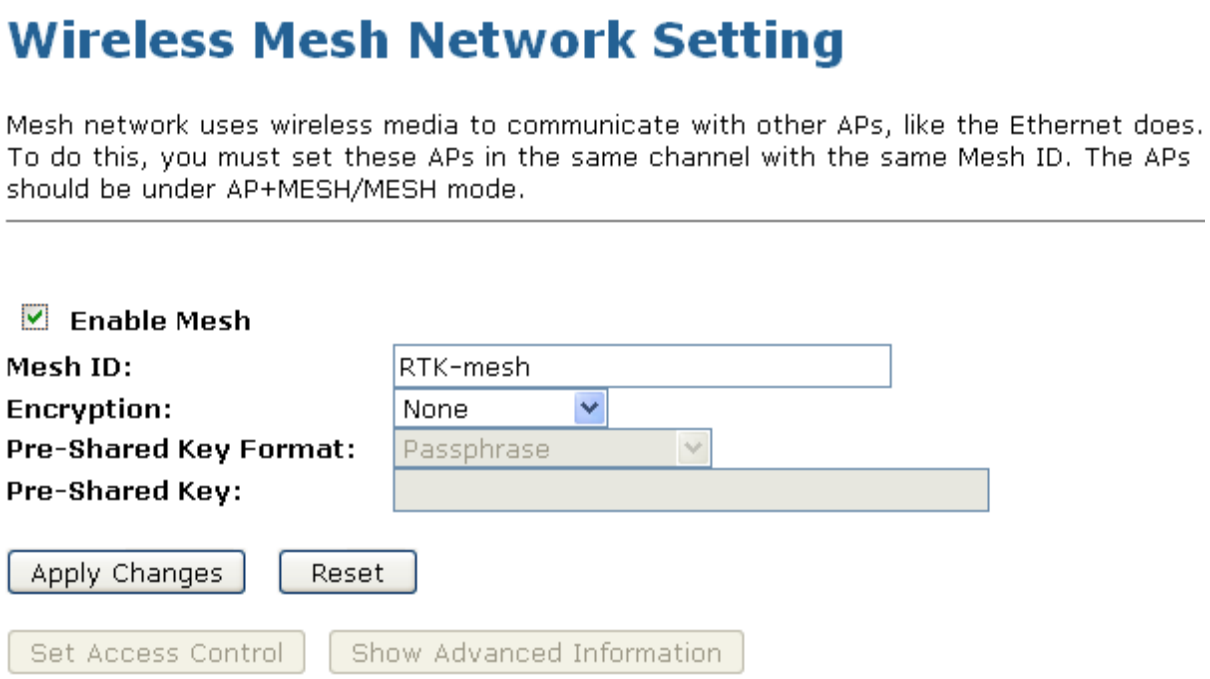
1. From the left-hand *Wireless* menu, click on *Basic Settings*.
2. From the *Mode* drop-down list, select *AP+MESH.*
3. Enter *SSID* for example 11n_AP_Router.
4. From the *Channel Number* drop-down list, select a Channel.
5. Click *Apply Changes* button.



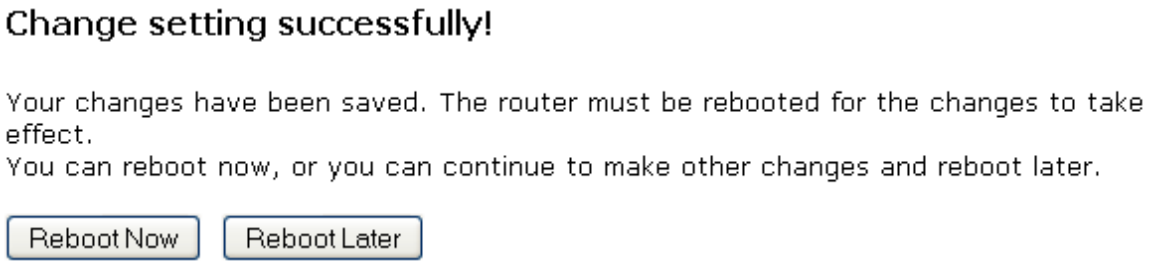
6. Change setting successfully! Click on *Reboot Now* button to confirm take effect.



7. From the left-hand *Wireless* menu, click on *Mesh settings*.
8. Check on the option *Enable Mesh*.
9. Enter the *Mesh ID*.
10. From the *Encryption* drop-down list, select the one and configure related settings.
11. Click the Apply Changes.



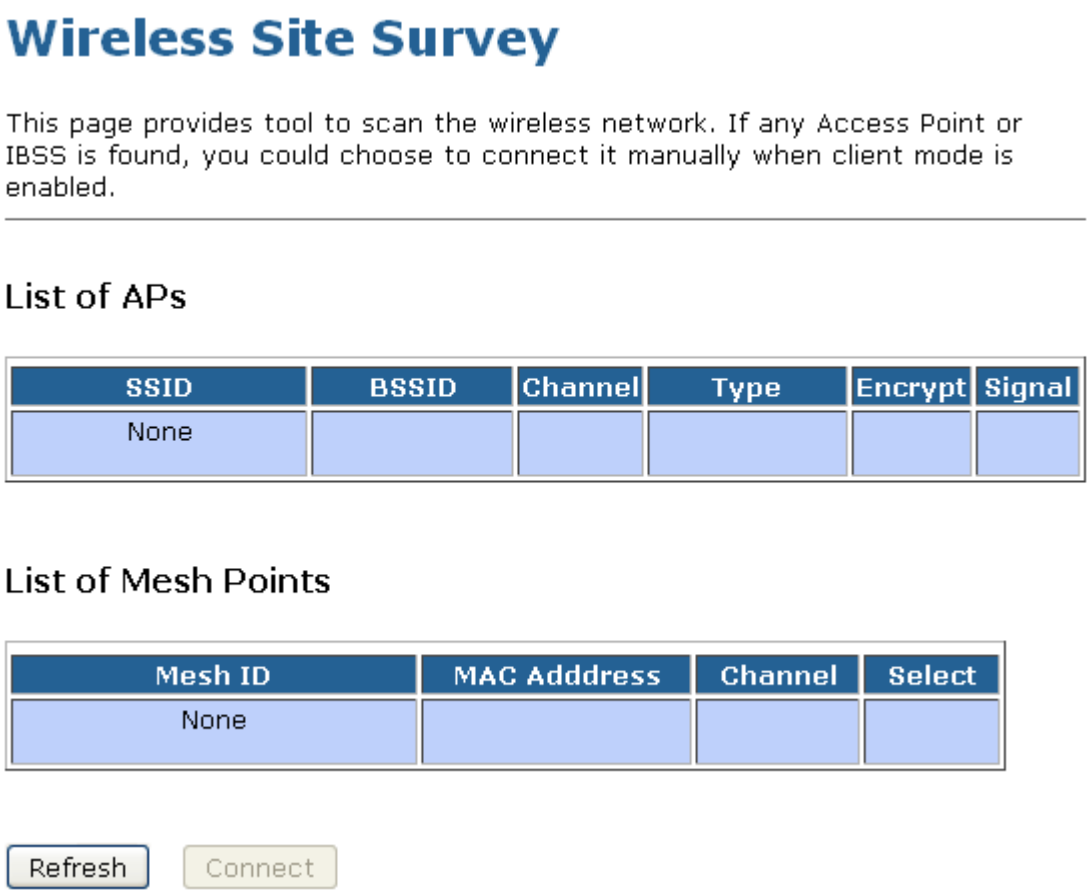
12. Change setting successfully! Click on *Reboot Now* button to confirm take effect.



Site Survey

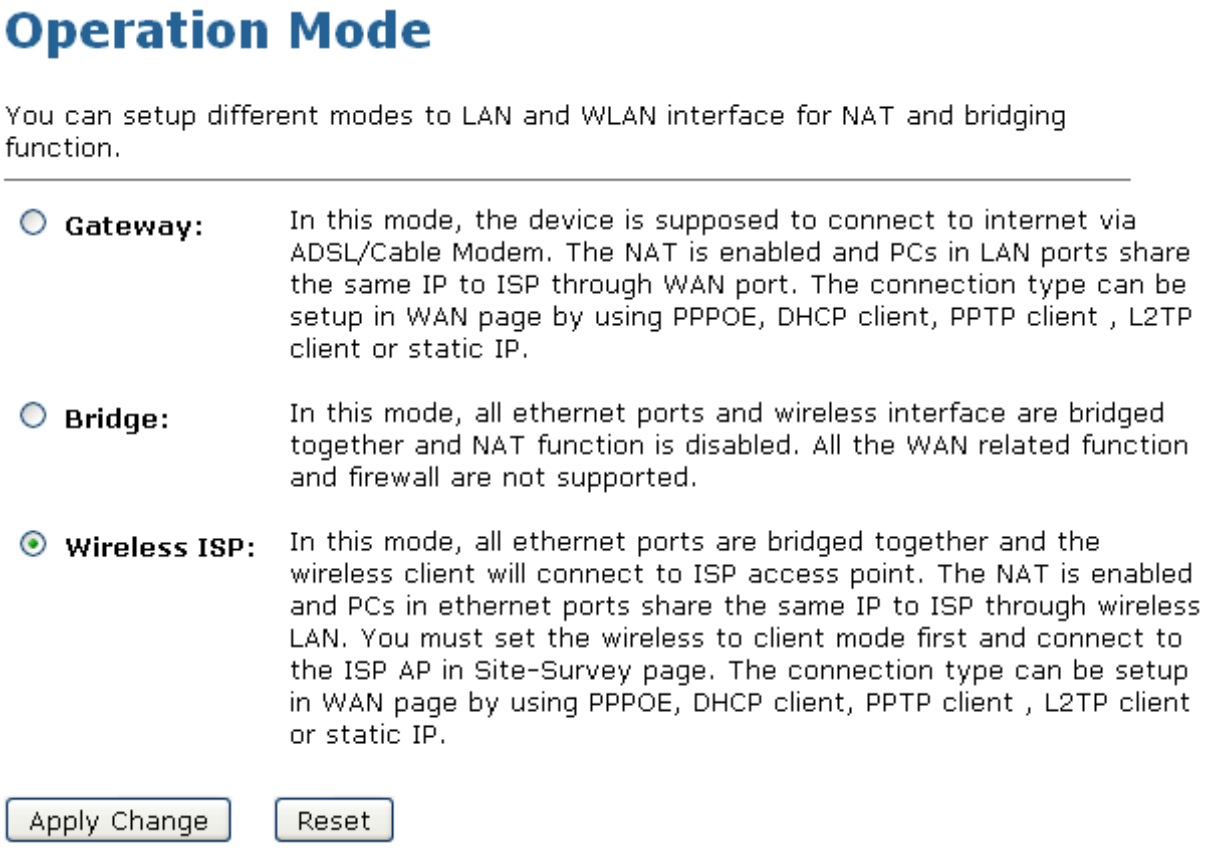
This page provides tool to scan the wireless network. If any Access Point or IBSS is found, you could choose to connect it manually when client mode is enabled. To access the *Wireless Network WDS settings* page:

From the left-hand *Wireless* menu, click on *Site Survey*. The following page is displayed:

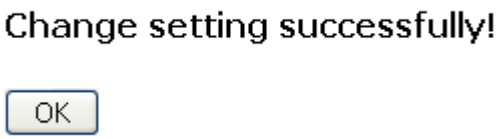


Configure Wireless ISP + Wireless client + Site Survey

1. From the left-hand Operation Mode menu, click on Wireless ISP Settings.
2. Click *Apply Changes* button.

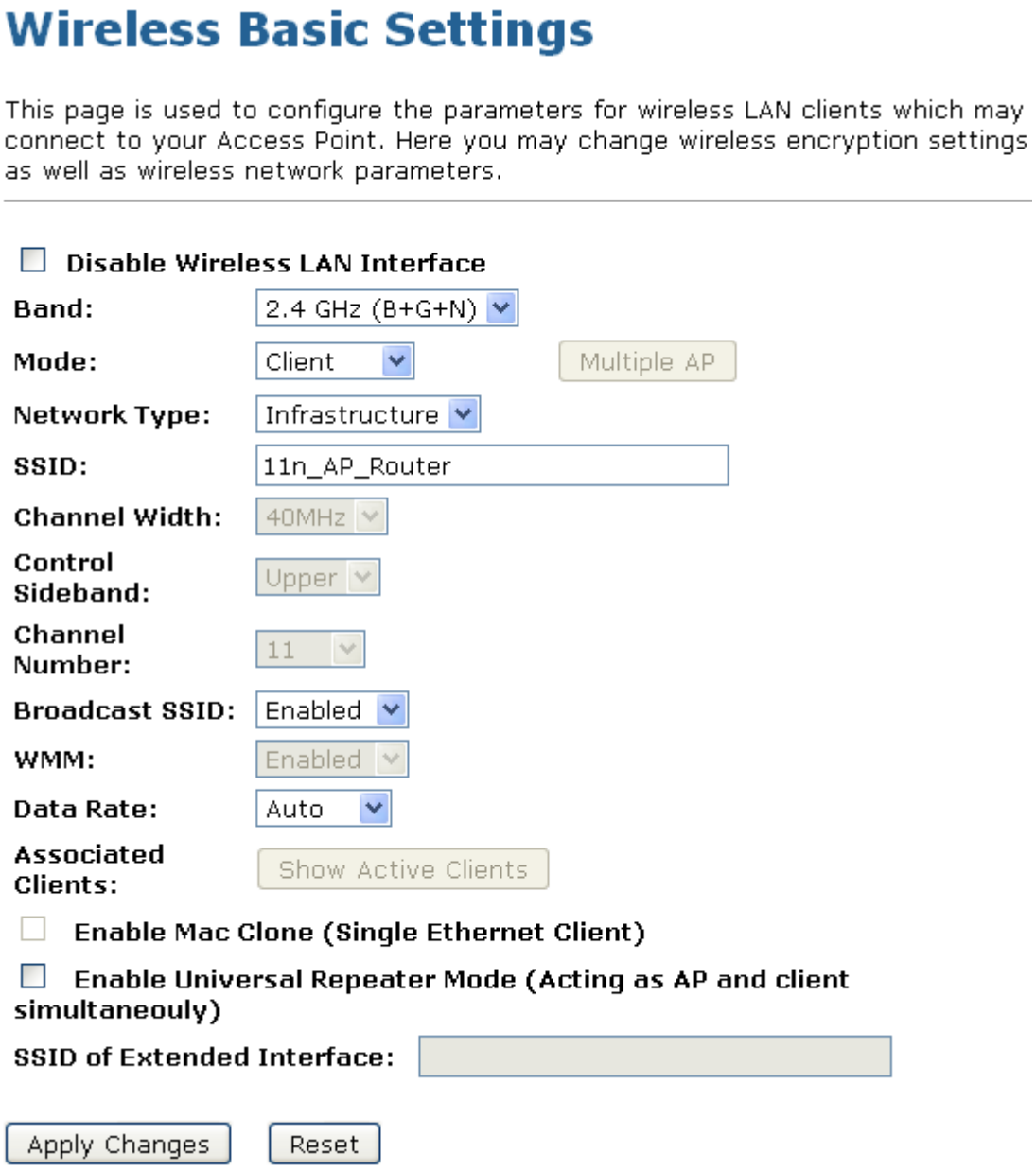


3. Change setting successfully! Click on *OK* button to confirm and return.

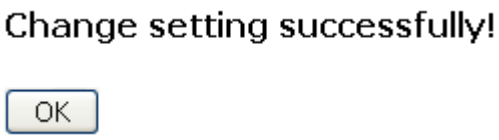


4. From the left-hand *Wireless* menu, click on *Basic Settings*.
5. From the *Mode* drop-down list, select *Client.*
6. Enter *SSID* of the AP that you want to connect to for example 11n_AP_Router. If you don't know what the SSID of the AP that you want to connect to, please skip this step.

7. Click *Apply Changes* button.

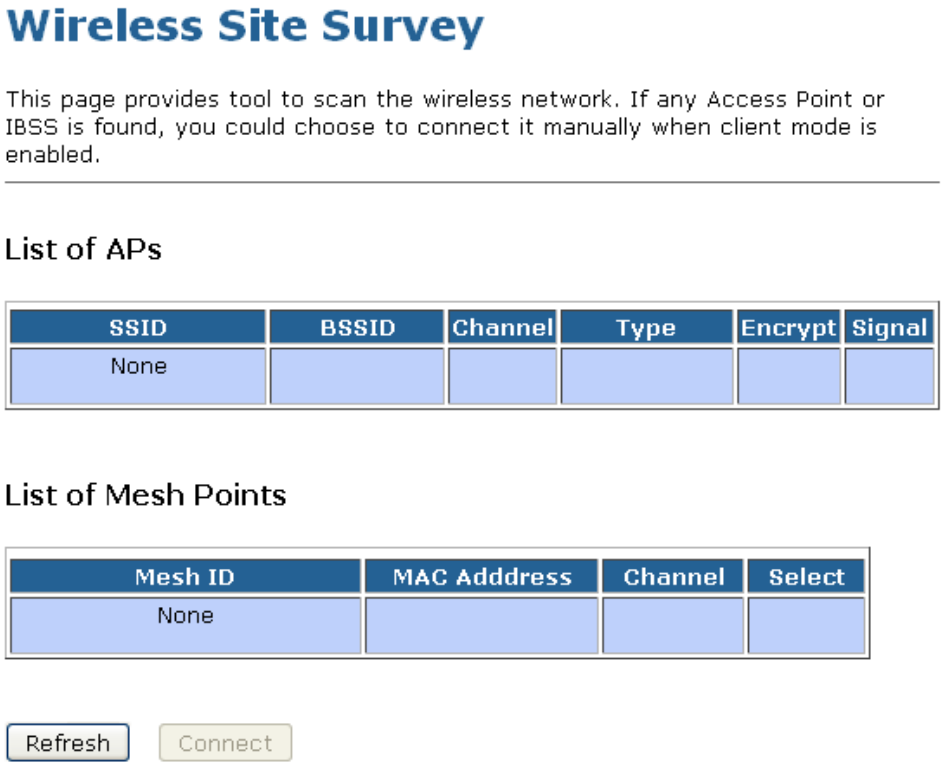


8. Change setting successfully! Click on *OK* button to confirm and return.

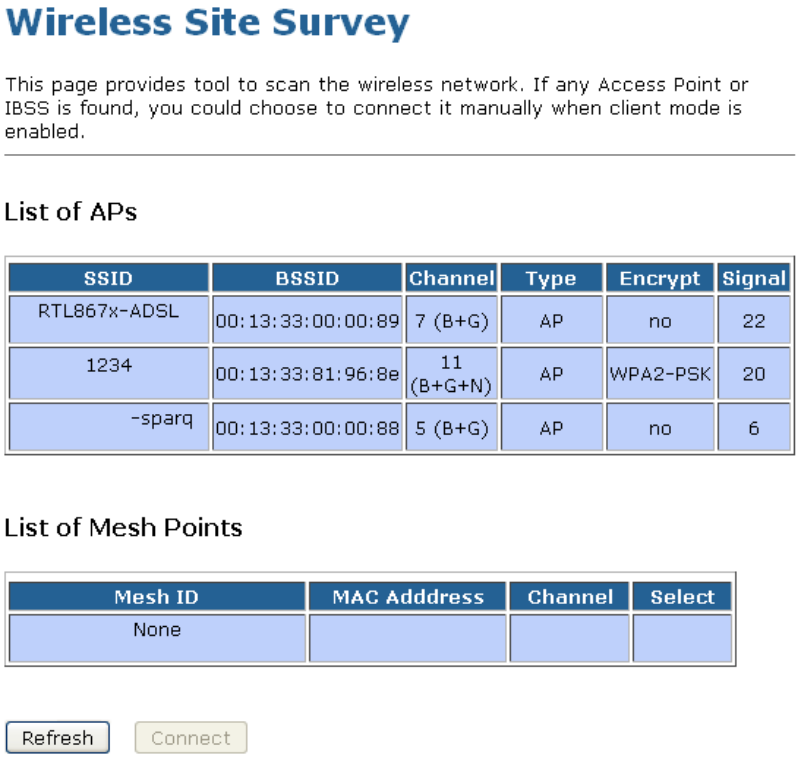


9. From the left-hand *Wireless* menu, click on *Site Survey*.

10. Click *Refresh* button.



11. Now you could see the APs that scanned by the Wireless Gateway were listed below.
12. Click on the ratio of AP's SSID under the item *Select* that you want the Wireless Gateway to connect to.
13. Click *Connect* button.



14. Connect successfully! Click on *OK* button to confirm and return.

10.7 WPS

This page allows you to change the setting for WPS (Wi-Fi Protected Setup). Using this feature could let your wireless client automatically syncronize its setting and connect to the Access Point in a minute without any hassle. To access the *Wireless Network WPS* page:

From the left-hand *Wireless* menu, click on *WPS*. The following page is displayed:

Field	Description
Disable WPS	• **Checking this box and clicking "Apply Changes" will disable Wi-Fi Protected Setup. WPS is turned on by default.**
WPS Status	• **When AP's settings are factory default (out of box), it is set to open security and un-configured state. It will be displayed by "WPS Status". If it already shows "Configured", some registrars such as Vista WCN will not configure AP. Users will need to go to the "Save/Reload Settings" page and click "Reset" to reload factory default settings.**
Self-PIN Number	• **"Self-PIN Number" is AP's PIN. Whenever users want to change AP's PIN, they could click "Regenerate PIN" and then click " Apply Changes". Moreover, if users want to make their own PIN, they could enter four digit PIN without checksum and then click " Apply Changes". However, this would not be recommended since the registrar side needs to be supported with four digit PIN.**

Field	Description
Push Button Configuration	**Clicking this button will invoke the PBC method of WPS. It is only used when AP acts as a registrar.**
Apply Changes	**Whenever users want to enable/disable WPS or change AP's PIN, they need to apply this button to commit changes.**
Reset	**It restores the original values of "Self-PIN Number" and "Client PIN Number".**
Client PIN Number	**It is only used when users want their station to join AP's network. The length of PIN is limited to four or eight numeric digits. If users enter eight digit PIN with checksum error, there will be a warning message popping up.** **If users insist on this PIN, AP will take it.**

Introduction of WPS

Although home Wi-Fi networks have become more and more popular, users still have trouble with the initial set up of network. This obstacle forces users to use the open security and increases the risk of eavesdropping. Therefore, WPS is designed to ease set up of security-enabled Wi-Fi networks and subsequently network management (Wi-Fi Protected Setup Specification 1.0h.pdf, p. 8).

The largest difference between WPS-enabled devices and legacy devices is that users do not need the knowledge about SSID, channel and security settings, but they could still surf in a security-enabled Wi-Fi network. For examples, in the initial network set up, if users want to use the PIN configuration, the only thing they need to do is entering the device PIN into registrar, starting the PIN method on that device and simply wait until the device joins the network. After the PIN method is started on both sides, a registration protocol will be initiated between the registrar and the enrollee. Typically, a registrar could be an access point or other device that is capable of managing the network. An enrollee could be an access point or a station that will join the network. After the registration protocol has been done, the enrollee will receive SSID and security settings from the registrar and then join the network. In other words; if a station attempts to join a network managed by an access point with built-in internal registrar, users will need to enter station's PIN into the web page of that access point. If the device PIN is correct and valid and users start PIN on station, the access point and the station will automatically exchange the encrypted information of the network settings under the management of AP's internal registrar. The station then uses this information to perform authentication algorithm, join the secure network, and transmit data with the encryption algorithm. More details will be demonstrated in the following sections.

Supported WPS features

Currently, Wireless Gateway supports WPS features for ***AP mode***, ***AP+WDS mode***, ***Infrastructure-Client mode***, and the ***wireless root interface of Universal Repeater mode***.

Other modes such as ***WDS mode***, ***Infrastructure-Adhoc mode***, and the ***wireless virtual interface of Universal Repeater mode*** are not implemented with WPS features.

If those unsupported modes are enforced by users, WPS will be disabled. Under the configuration of every WPS-supported mode, Wireless Gateway has *Push Button method* and *PIN method*. For each method, Wireless Gateway offers different security levels included in network credential, such as open security, WEP 64 bits, WEP 128 bits, WPA-Personal TKIP, WPA-Personal AES, WPA2-Personal TKIP, and WPA2-Personal AES. Users could choose either one of the methods at their convenience.

AP mode

For AP mode, Wireless Gateway supports three roles, registrar, proxy, and enrollee in registration protocol. At different scenarios, Wireless Gateway will automatically switch to an appropriate role depending on the other device's role or a specific configuration.

AP as Enrollee

If users know AP's PIN and enter it into external registrar, the external registrar will configure AP with a new wireless profile such as new SSID and new security settings. The external registrar does this job either utilizing the in-band EAP (wireless) or out-of-band UPnP (Ethernet). During the WPS handshake, a wireless profile is encrypted and transmitted to AP. If the handshake is successfully done, AP will be re-initialized with the new wireless profile and wait for legacy stations or WPS stations to join its network.

AP as Registrar

Wireless Gateway also has a built-in internal registrar. Whenever users enter station's PIN into AP's webpage, click "Start PBC", or push the physical button, AP will switch to registrar automatically. If users apply the same method on station side and the WPS handshake is successfully done, SSID and security settings will be transmitted to that station without the risk of eavesdropping. And then the station will associate with AP in a security-enabled network.

AP as Proxy

At this state, AP is transparent to users. If users want to configure a station or any device that is capable of being an enrollee, they have to enter device's PIN into an external registrar and choose an appropriate wireless profile. After the PIN is entered, the external registrar will inform AP this event. AP then conveys the encrypted wireless profile between the device and the external registrar. Finally, the device will use the wireless profile and associate with AP. However, the device may connect to other APs if the wireless profile does not belong to the proxy AP. Users must carefully choose the wireless profile or create a wireless profile on an external registrar.

Infrastructure-Client mode

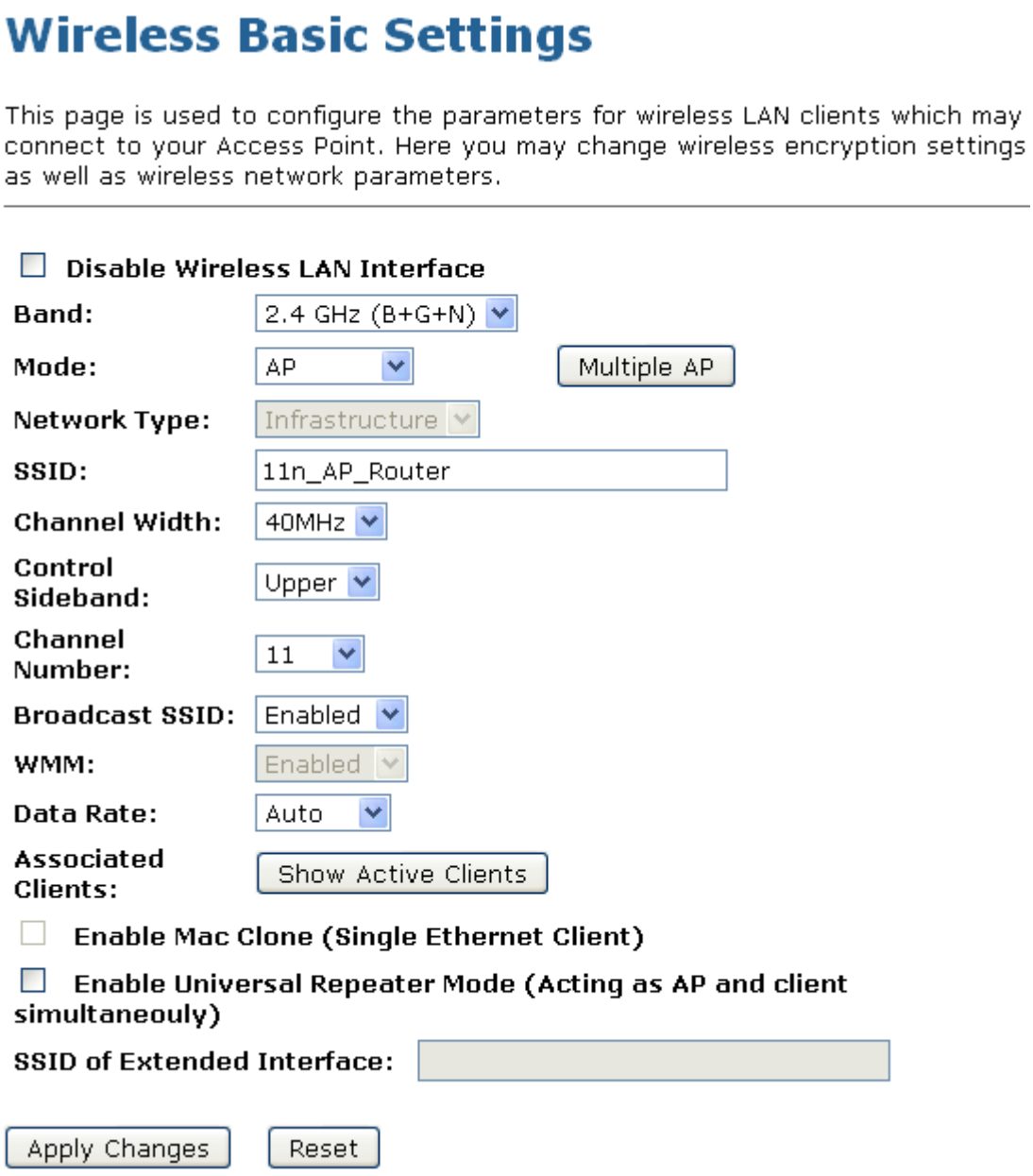
In Infrastructure-Client mode, Wireless Gateway only supports enrollee's role. If users click "Start PIN", click "Start PBC", or press the physical button on Wireless Gateway, it will start to seek WPS AP. Once users apply the same method on registrar side, Wireless Gateway will receive the wireless profile upon successfully doing the registration protocol. Then Wireless Gateway will associate with an AP.

Instructions of AP's and Client's operations

At this state, AP is transparent to users. If users want to configure a station or any device that is capable of being an enrollee, they have to enter device's PIN into an external registrar and choose an appropriate wireless profile. After the PIN is entered, the external registrar will inform AP this event. AP then conveys the encrypted wireless profile between the device and the external registrar. Finally, the device will use the wireless profile and associate with AP. However, the device may connect to other APs if the wireless profile does not belong to the proxy AP. Users must carefully choose the wireless profile or create a wireless profile on an external registrar.

Wireless Advanced Settings page

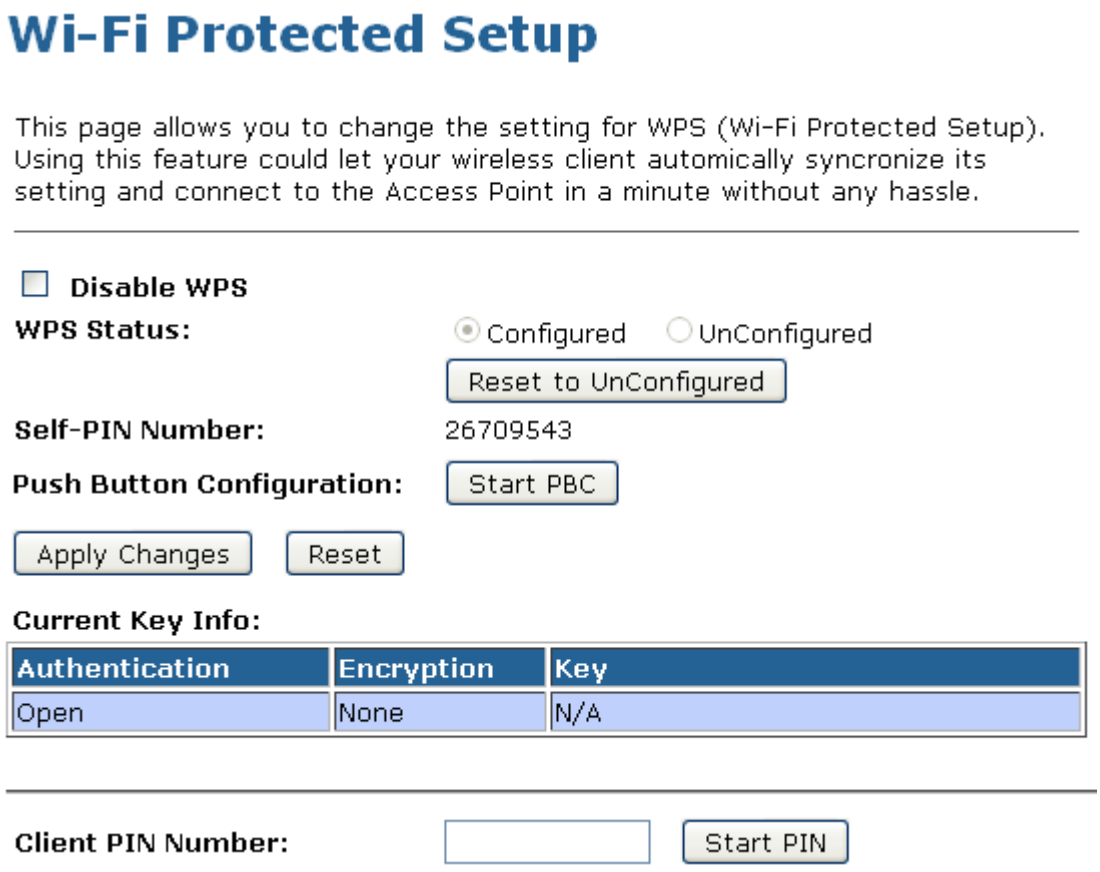
Users need to make sure the “Broadcast SSID” file is set to “Enabled”. Otherwise, it might prevent WPS from working properly.



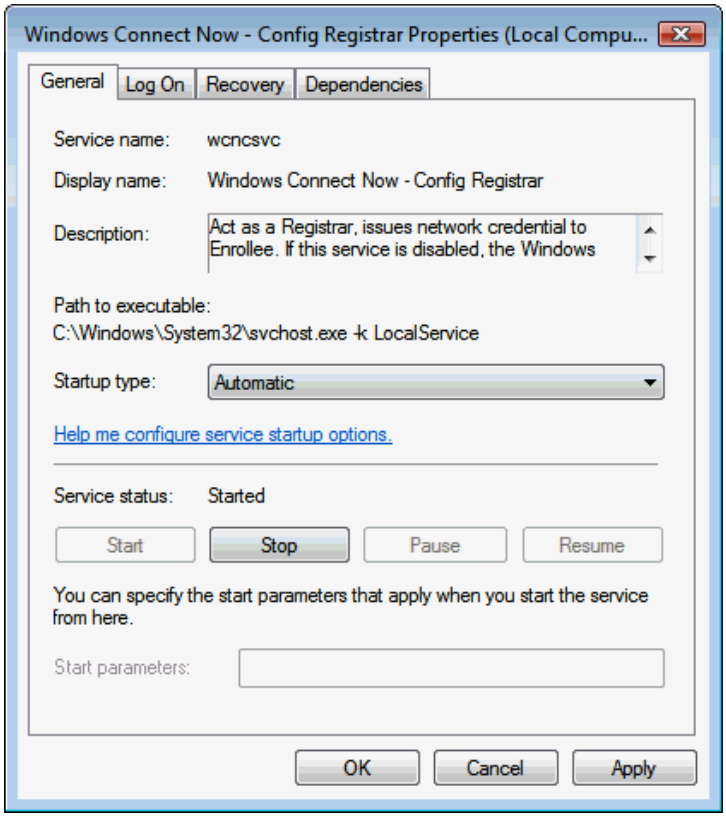
10.8 Operations of AP - AP being an enrollee

In this case, AP will be configured by any registrar either through in-band EAP or UPnP. Here, users do not need to do any action on AP side. They just need AP's device PIN and enter it into registrar. An example from Vista WCN will be given.

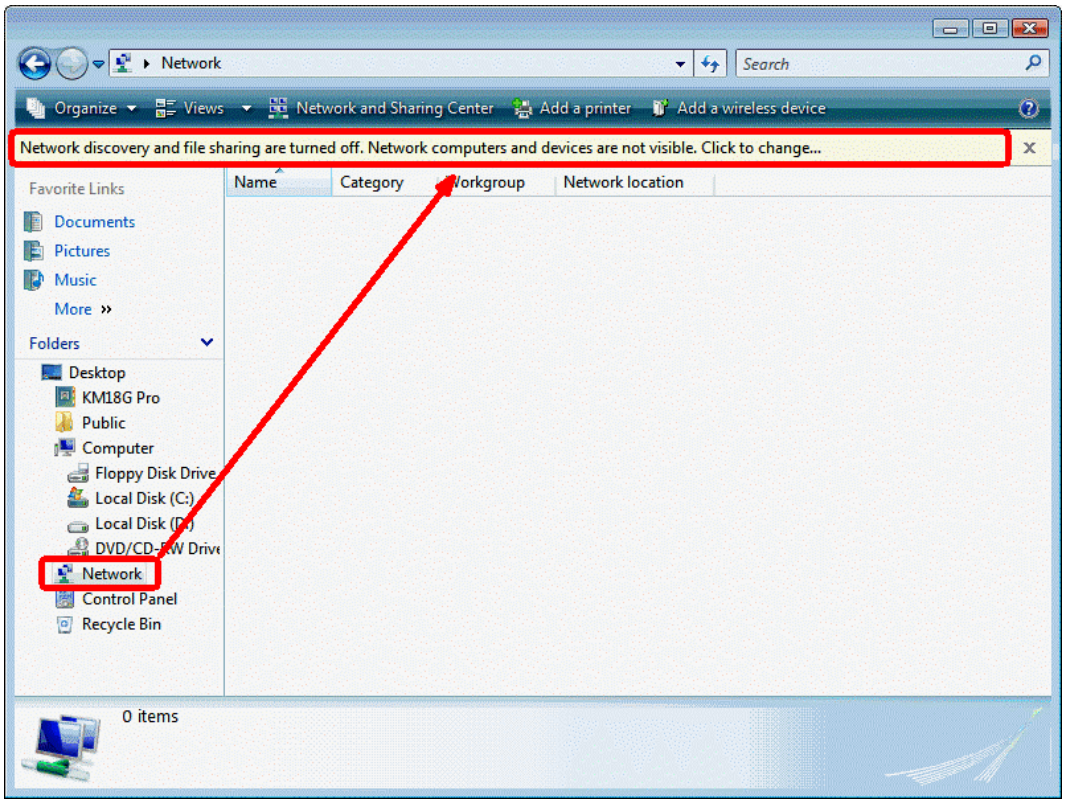
1. From the left-hand *Wireless -> WPS* menu. The following page is displayed:
2. Make sure AP is in un-configured state.



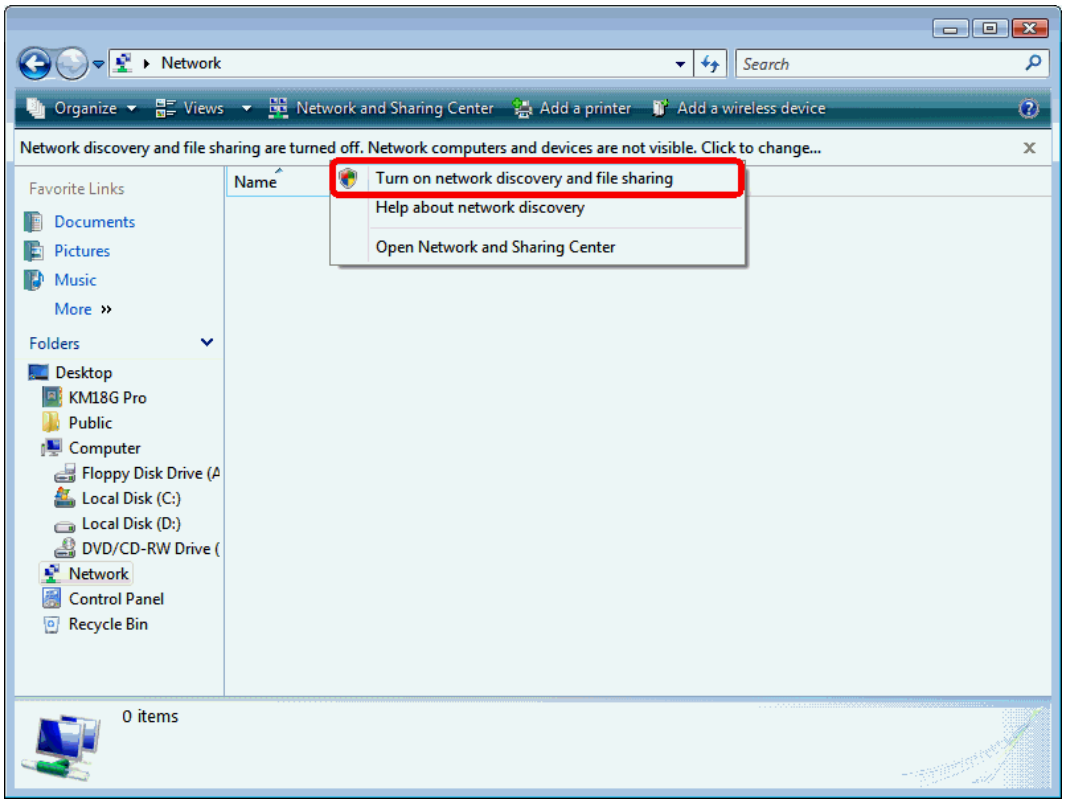
3. Plug the Ethernet cable into AP's LAN port and make sure the IP connection is valid with Vista.
4. Make sure WCN is enabled. Users may need to enable it at the first time. They could open the "Control Panel", click "Classic View", open "Administrative Tools", double click "Services", a User Account Control pop up and click "Continue", edit properties of "Windows Connect Now", choose the "Startup type" with "Automatic" and click "Start".



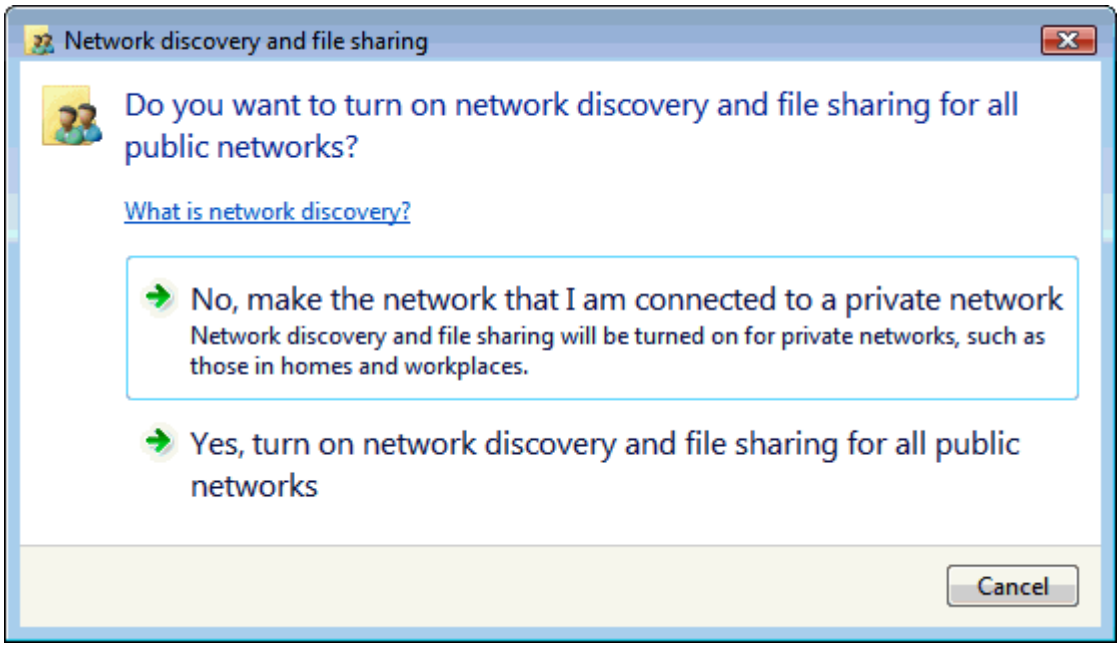
5. If the previous steps are done, open Windows Explorer. Go to the Network section.
6. Click on “Network discovery and file sharing are turned off. Network computers and devices are not visible. Click to change…“



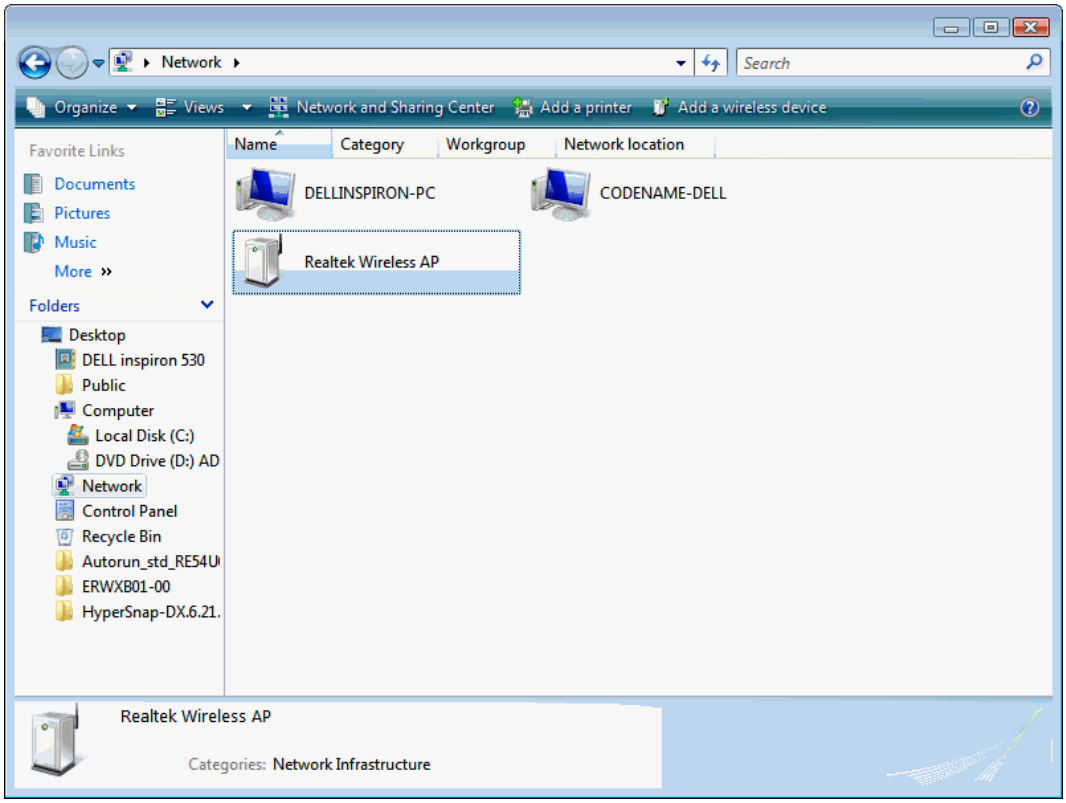
7. Click on “Turn on network discovery and file sharing“



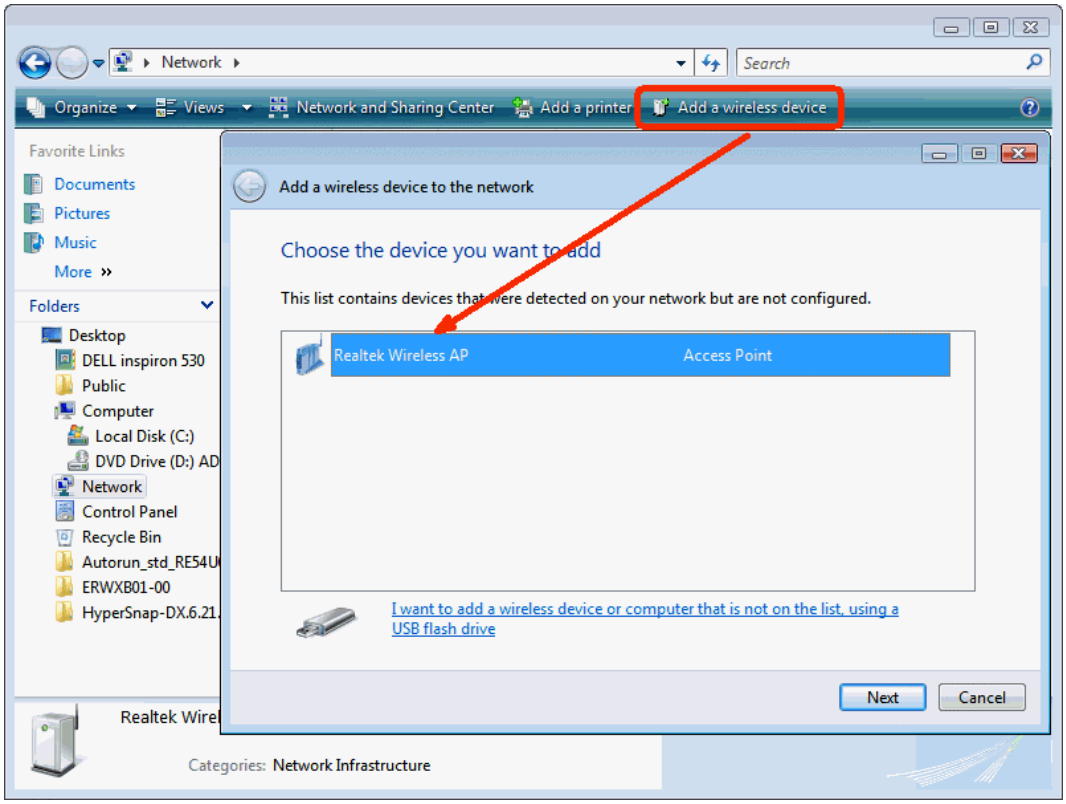
8. Click on “No, make the network that I am connected to a private network“



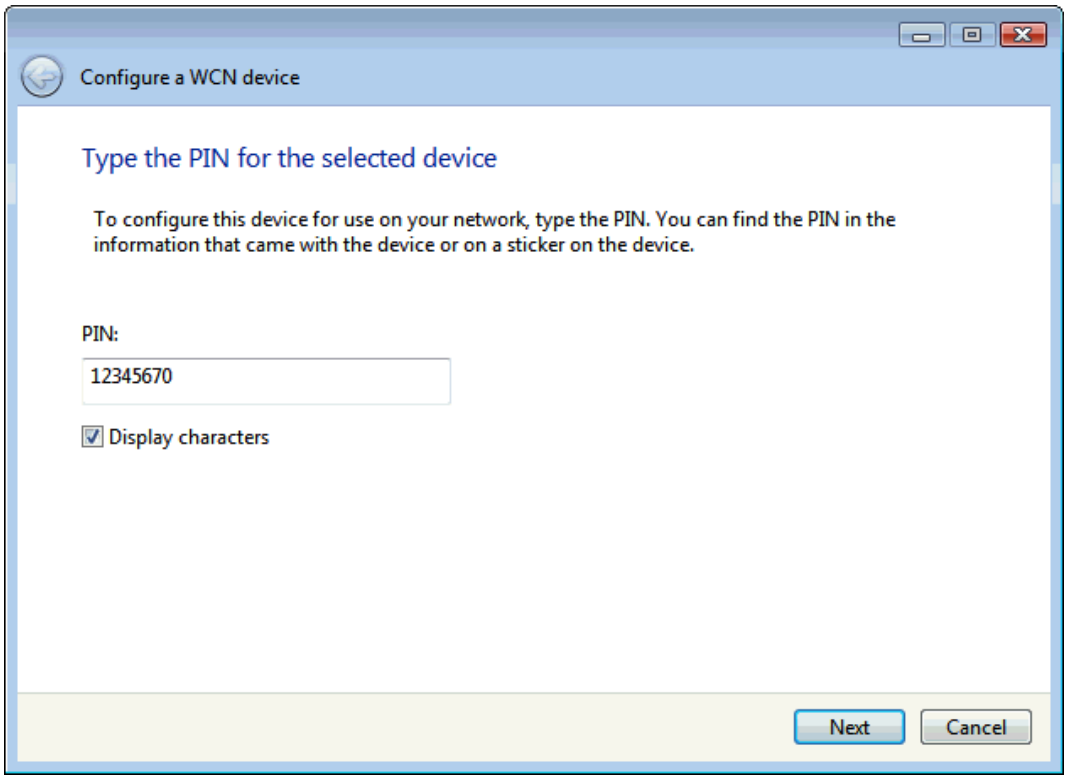
9. AP's icon will show up. Double click on it.



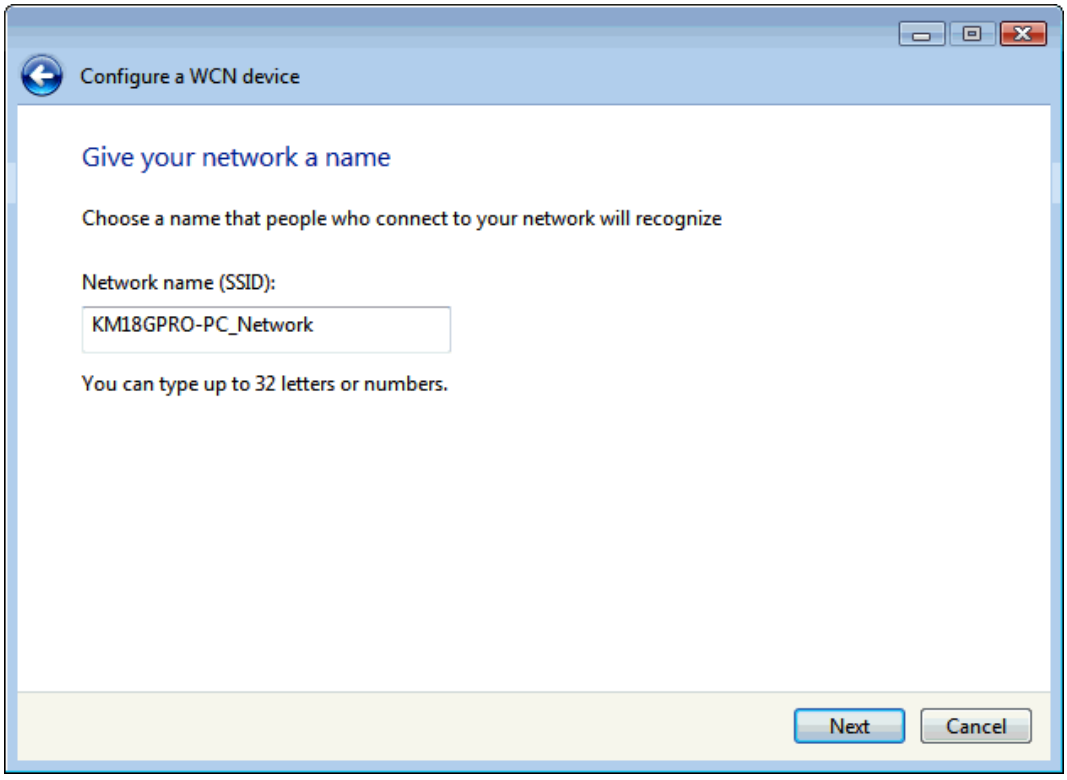
10. Users could also Click "Add a wireless device" if the icon is not there. Click "next".



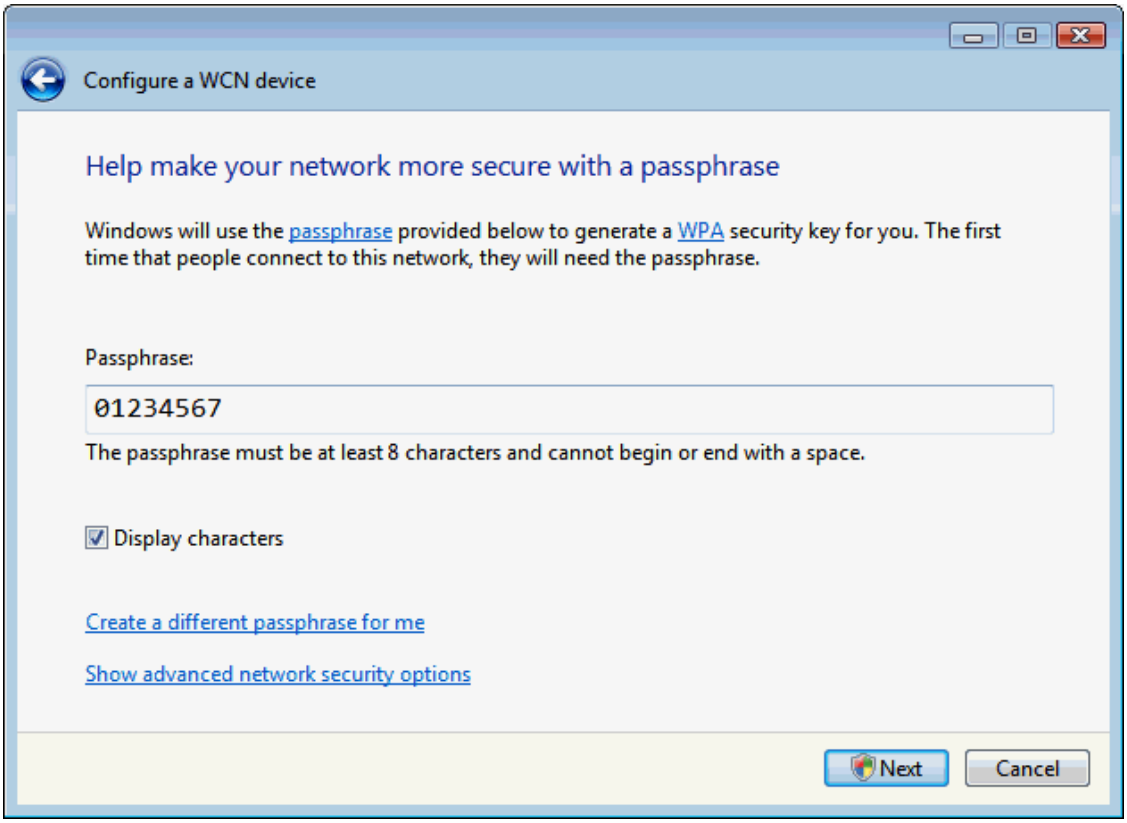
11. Enter AP's Self-PIN Number and click ""Next".



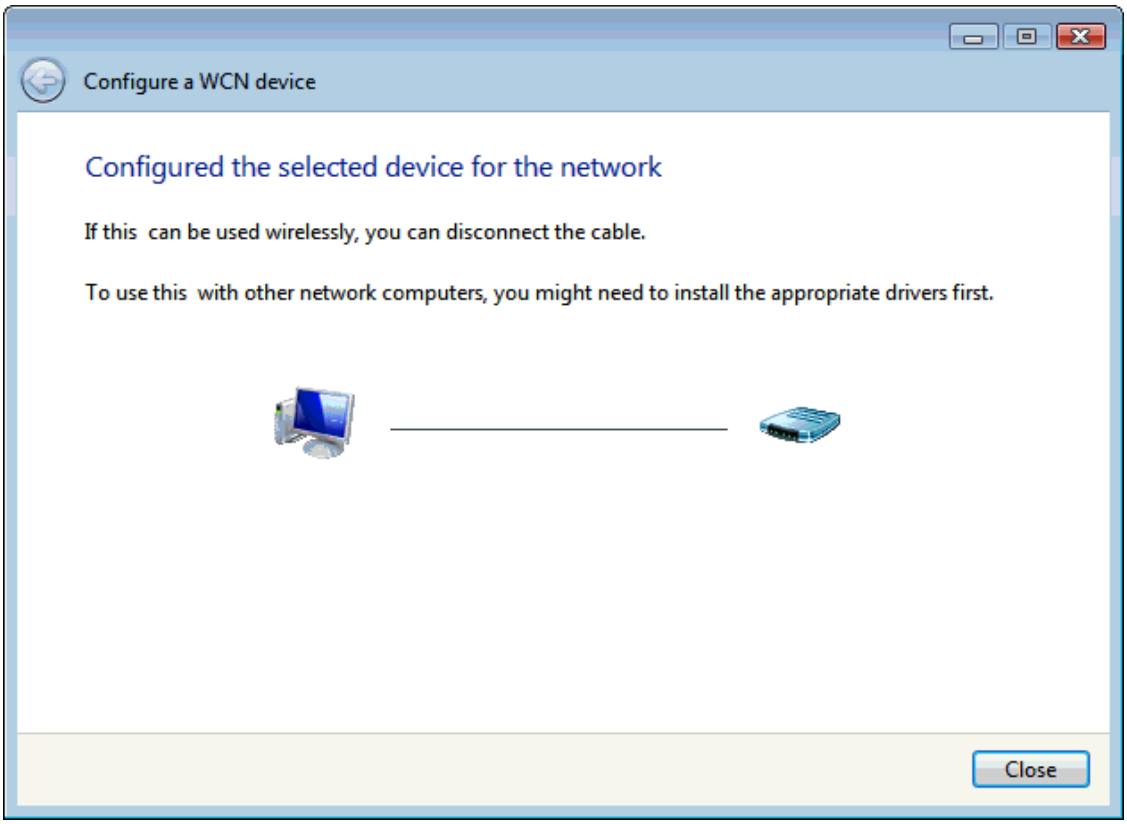
12. Choose a name that people who connect to your network will recognize.



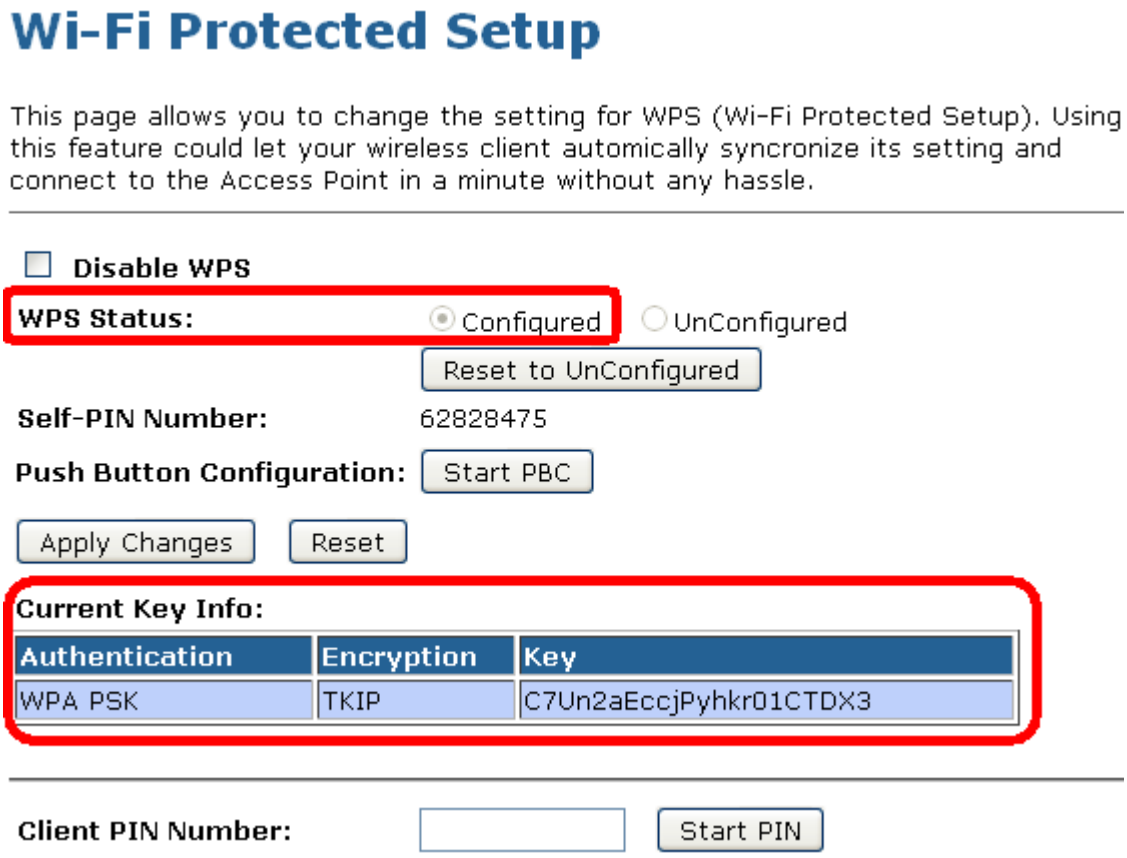
13. Enter the Passphrase and then click “Next”.



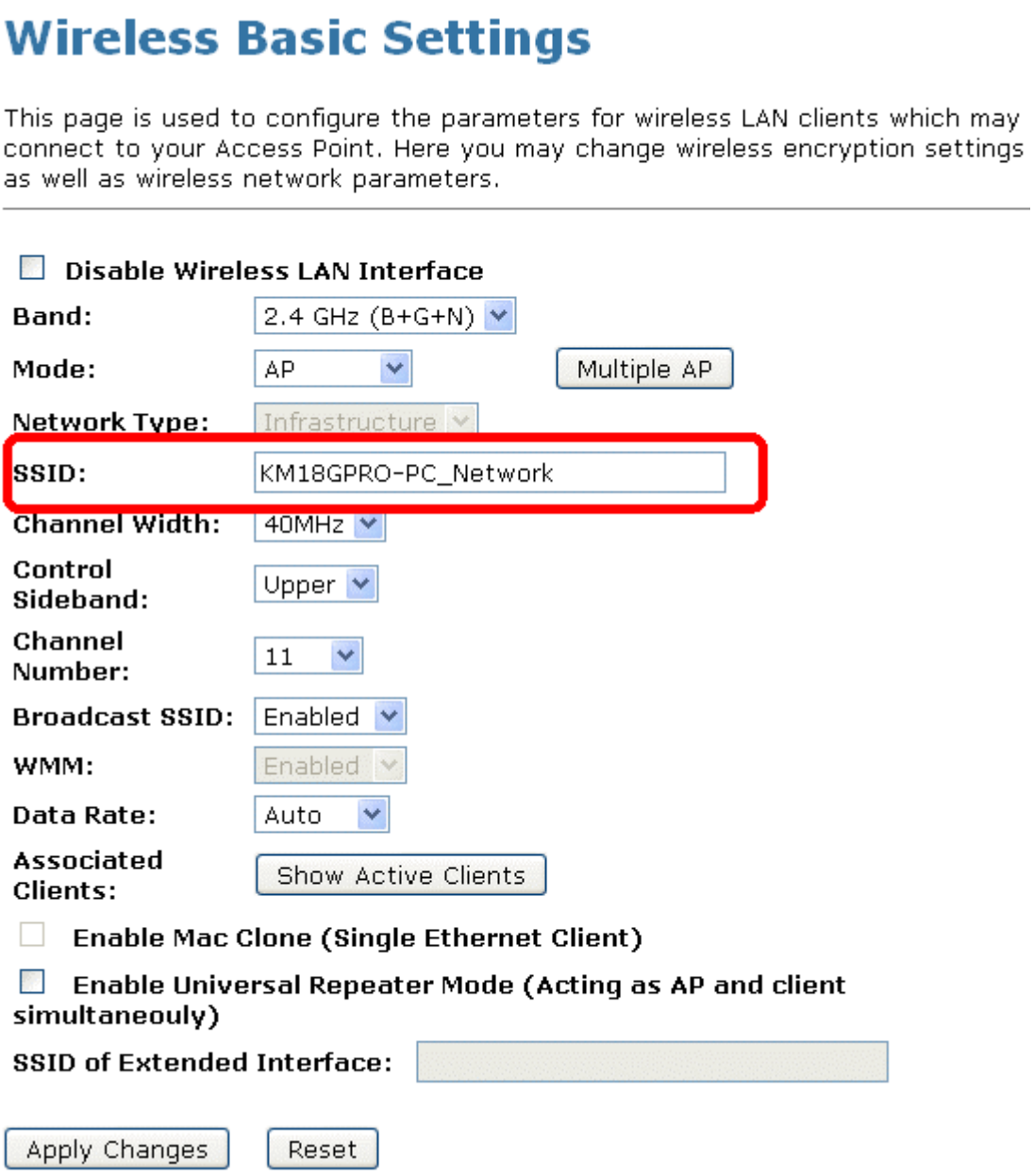
14. A User Account Control screen pops up, click Continue.
15. AP is successfully configured by WCN.



16. Finally, AP will become configured (see WPS Status). The authentication algorithm, encryption algorithm, and key assigned by WCN will be displayed below “Current Key Info”.



17. The SSID field of Wireless Basic Settings page will also be modified with the value assigned by WCN.



18. The security settings on the Wireless Security Page will be modified by WCN, too. The warning message will show up if users try to modify the security settings. The reason is the same as we explained in the previous section.

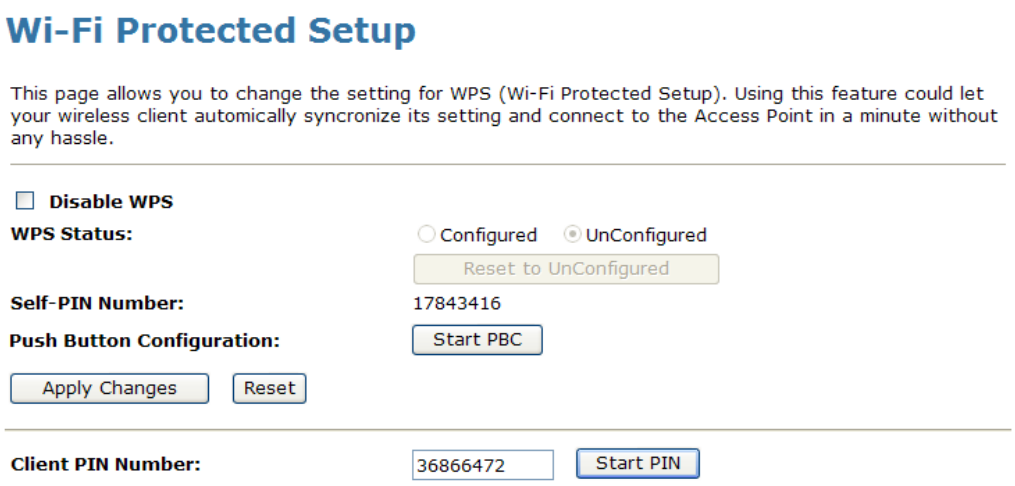
Wireless Security Setup
This page allows you setup the wireless security. Turn on WEP or WPA by using Encryption Keys could prevent any unauthorized access to your wireless network.
Select SSID:
Root AP - DELLINSPIRON-PC_Network
Apply Changes
Reset
Encryption:
WPA
Authentication Mode:
Enterprise (RADIUS)
Personal (Pre-Shared Key)
WPA Cipher Suite:
TKIP
AES
Pre-Shared Key Format:
Passphrase
Pre-Shared Key:

10.9 Operations of AP - AP being a registrar

AP mode

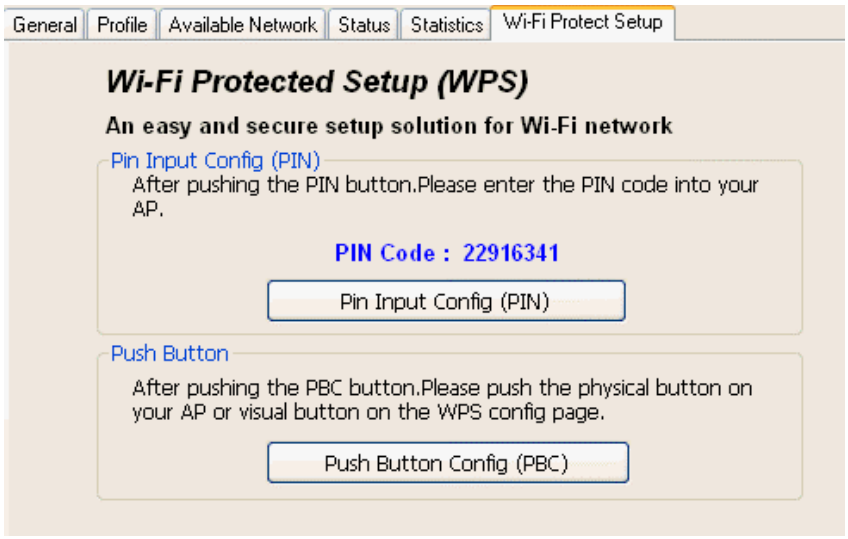
Whenever users enter station's PIN into AP's Wi-Fi Protected Setup page and click "Start PIN", AP will become a registrar. Users must start the PIN method on the station side within two minutes.

1. From the left-hand *Wireless -> WPS* menu. The following page is displayed:
2. Make sure AP is in un-configured state.
3. Enter the Client PIN Number.
4. Click Start PIN.

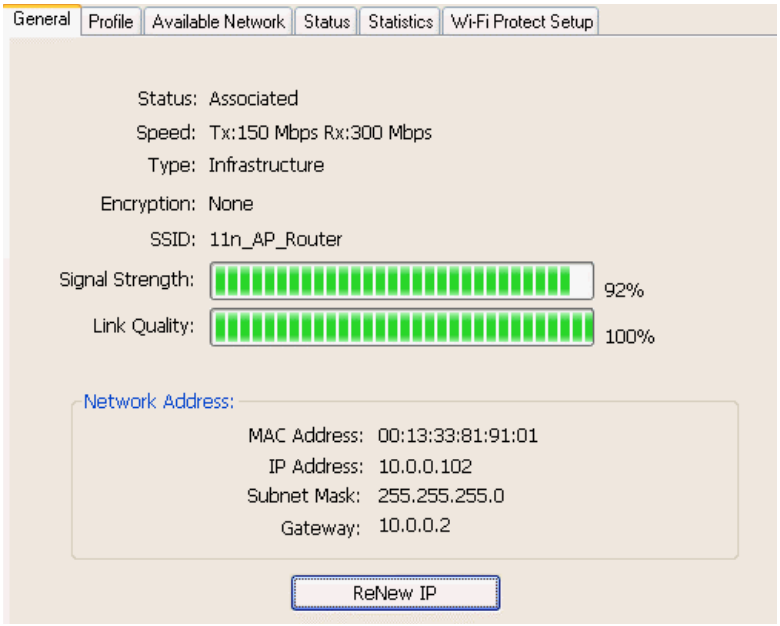


5. Users must start the PIN method on the station side within two minutes.

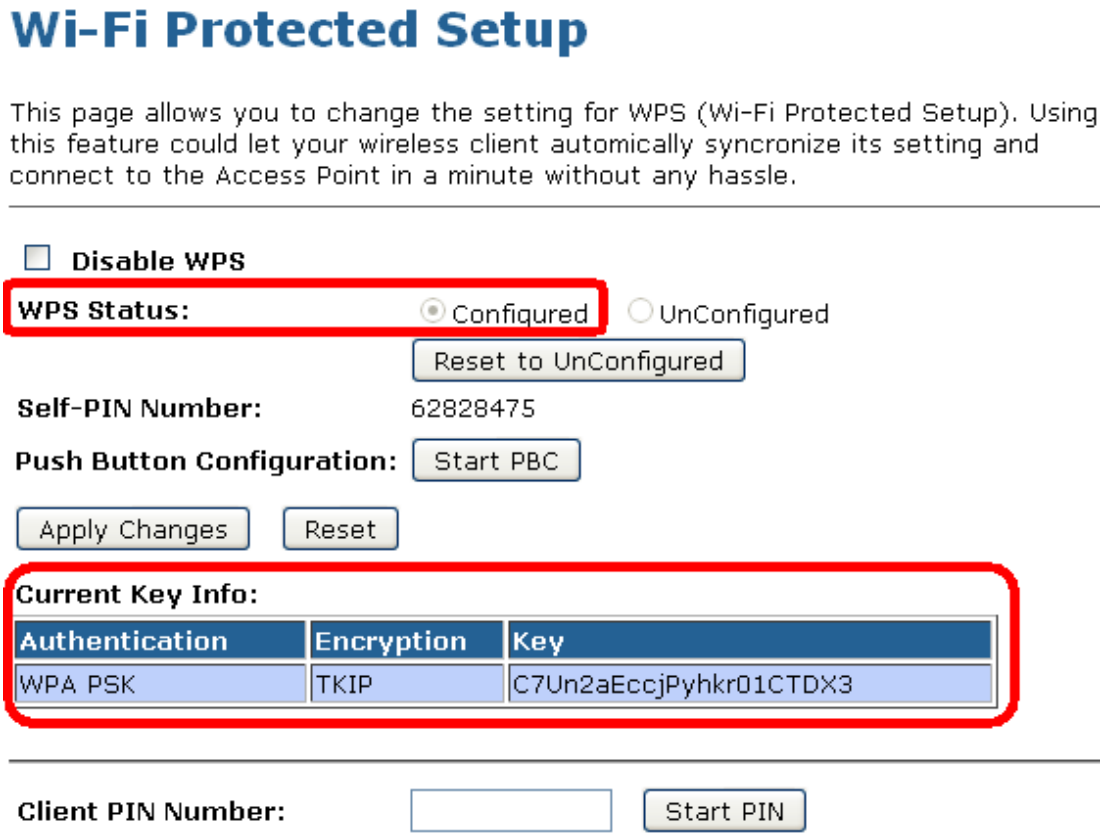
6. Users must start the PIN method on the station side within two minutes.



7. If the device PIN is correct and the WPS handshake is successfully done on the station side, User's Wi-Fi Protected status will be shown as below.



8. If the device PIN is correct and the WPS handshake is successfully done, AP's Wi-Fi Protected Setup page will be shown as below.



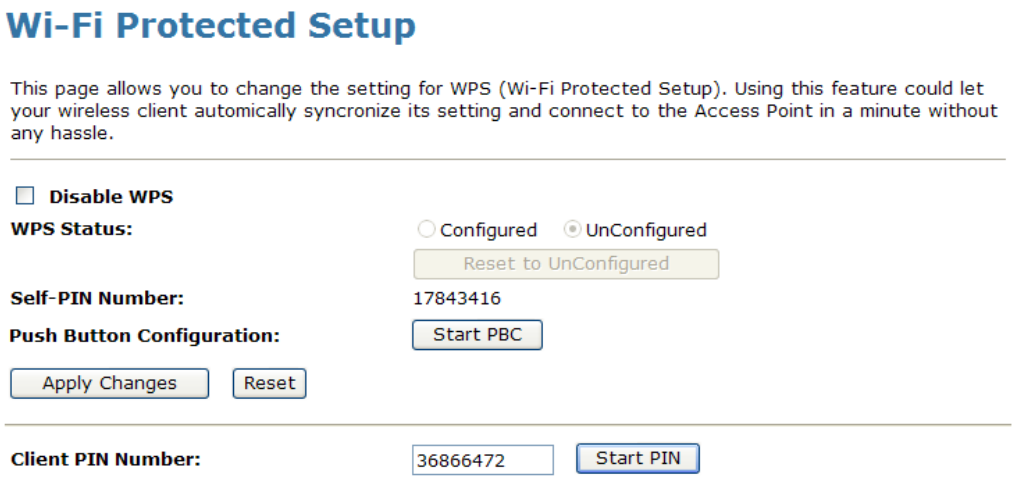
Other pages such as Wireless Basic Settings page and Wireless Security Setup page will also be updated appropriately as described in previous sections. In this case, AP is in un-configured state before the station initiates the WPS handshake. According to the WPS spec, AP will create a wireless profile with WPA2-mixed mode and a random-generated key upon successfully doing the WPS handshake. However, AP will use the original wireless profile and give it to the station if AP is already in configured state. That means all settings of AP will not change. Hence, all WPS related pages keep the same.

Push Button method

Wireless Gateway supports a virtual button “Start PBC” on the *Wi-Fi Protected Setup page* for Push Button method. If users push a virtual button “Start PBC”, AP will initiate a WPS session and wait for any station to join. At this moment, AP will detect whether there is more than one station that starts the PBC method. When multiple PBC sessions occur, users should try PIN method.

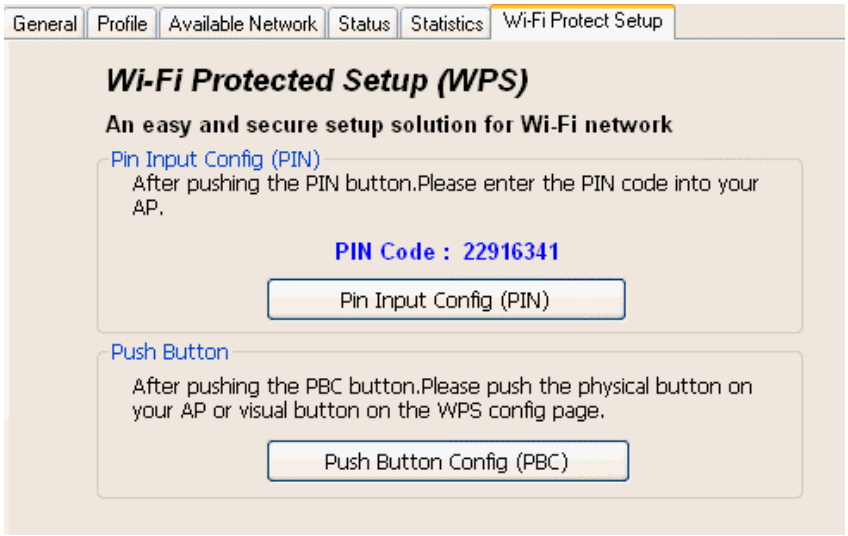
After users push AP’s virtual button “Start PBC”, they must go to station side to push its button within two minutes. If the WPS is successfully done, AP will give its wireless profile to that station. The station could use this profile to associate with AP.

1. From the left-hand *Wireless -> WPS* menu. The following page is displayed:
2. Make sure AP is in un-configured state.
3. Click *Start PBC*.

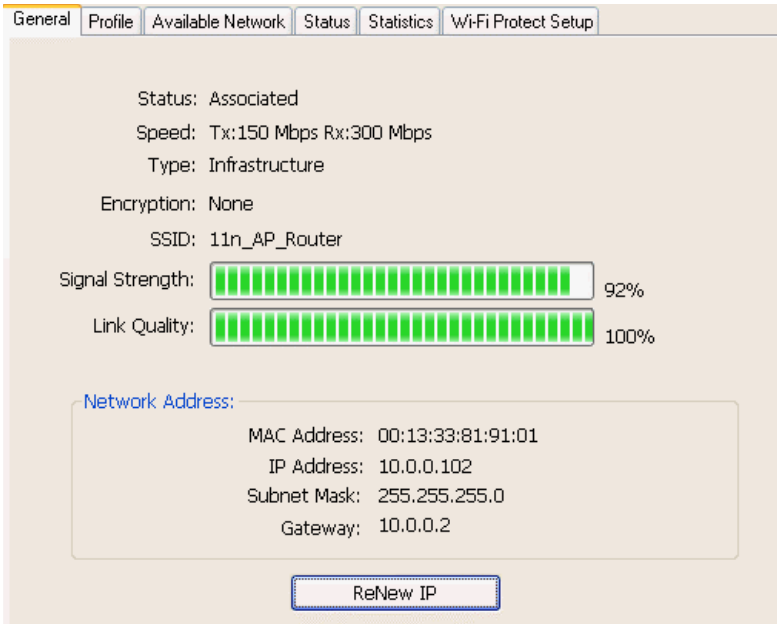


4. Users must start the PBC method on the station side within two minutes.

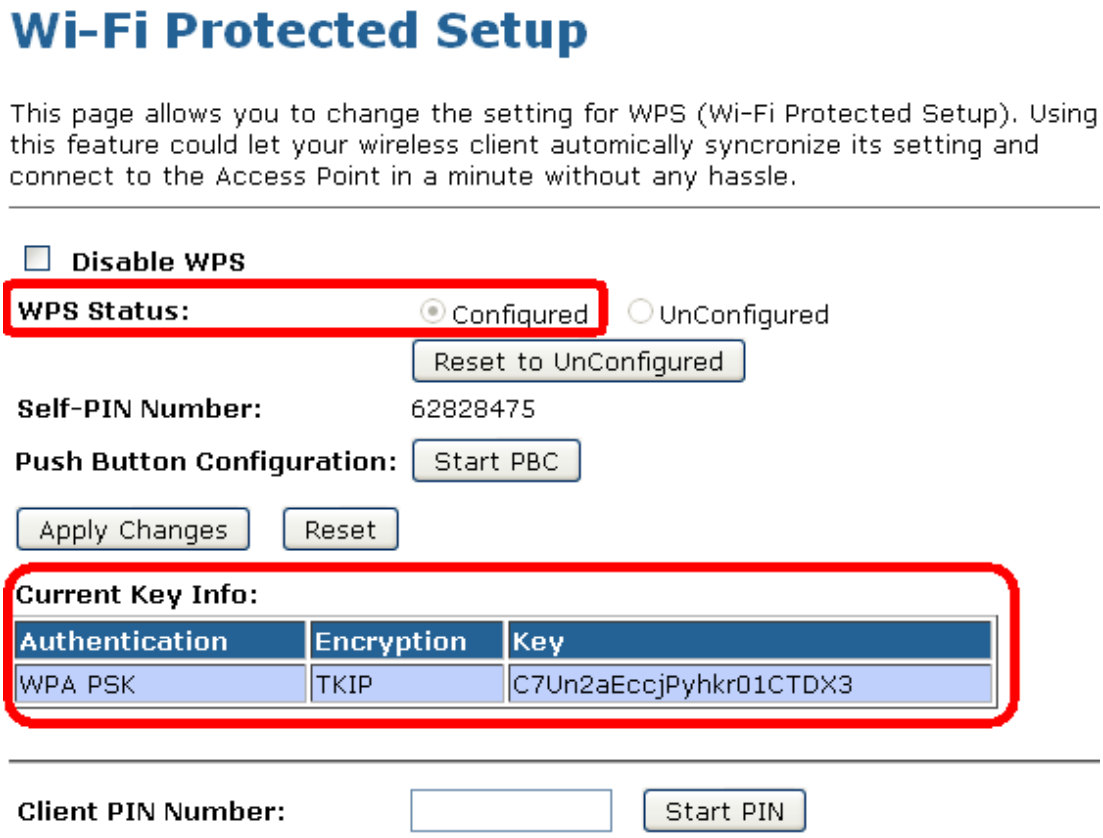
5. Users must start the PBC method on the station side within two minutes.



6. If the device PBC and the WPS handshake are successfully done on the station side, User's Wi-Fi Protected status will be shown as below.



7. If the device PIN is correct and the WPS handshake is successfully done, AP's Wi-Fi Protected Setup page will be shown as below.

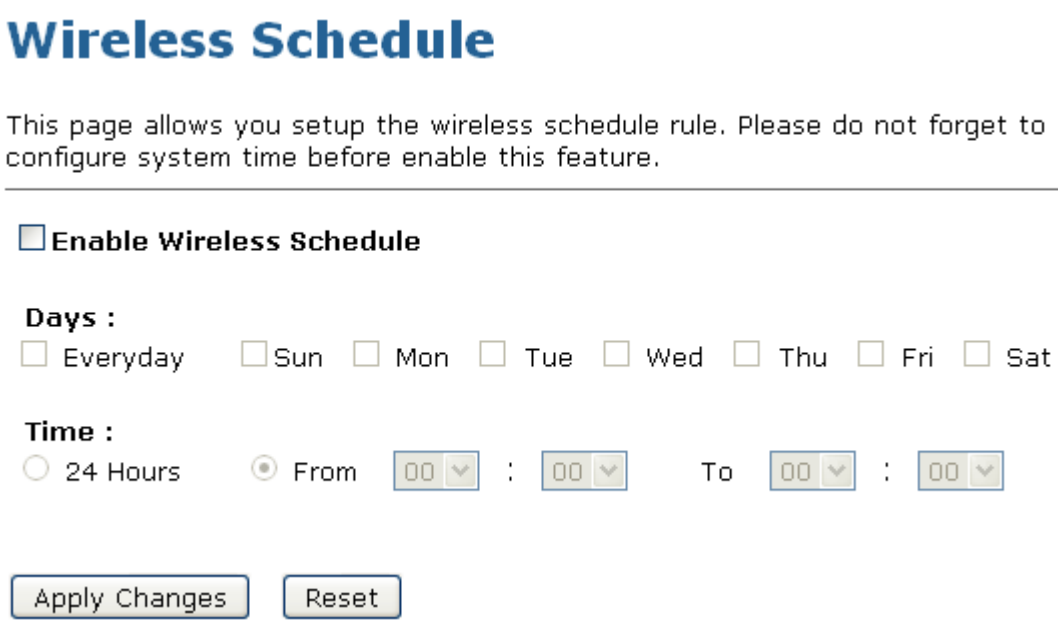


Other pages such as Wireless Basic Settings page and Wireless Security Setup page will also be updated appropriately as described in previous sections. In this case, AP is in un-configured state before the station initiates the WPS handshake. According to the WPS spec, AP will create a wireless profile with WPA2-mixed mode and a random-generated key upon successfully doing the WPS handshake. However, AP will use the original wireless profile and give it to the station if AP is already in configured state. That means all settings of AP will not change. Hence, all WPS related pages keep the same.

10.10 Wireless Schedule

This page allows you setup the wireless schedule rule. Please do not forget to configure system time before enable this feature. To access the *Wireless Schedule* page:

From the left-hand *Wireless* menu, click on *Wireless Schedule*. The following page is displayed:



11. LAN Interface

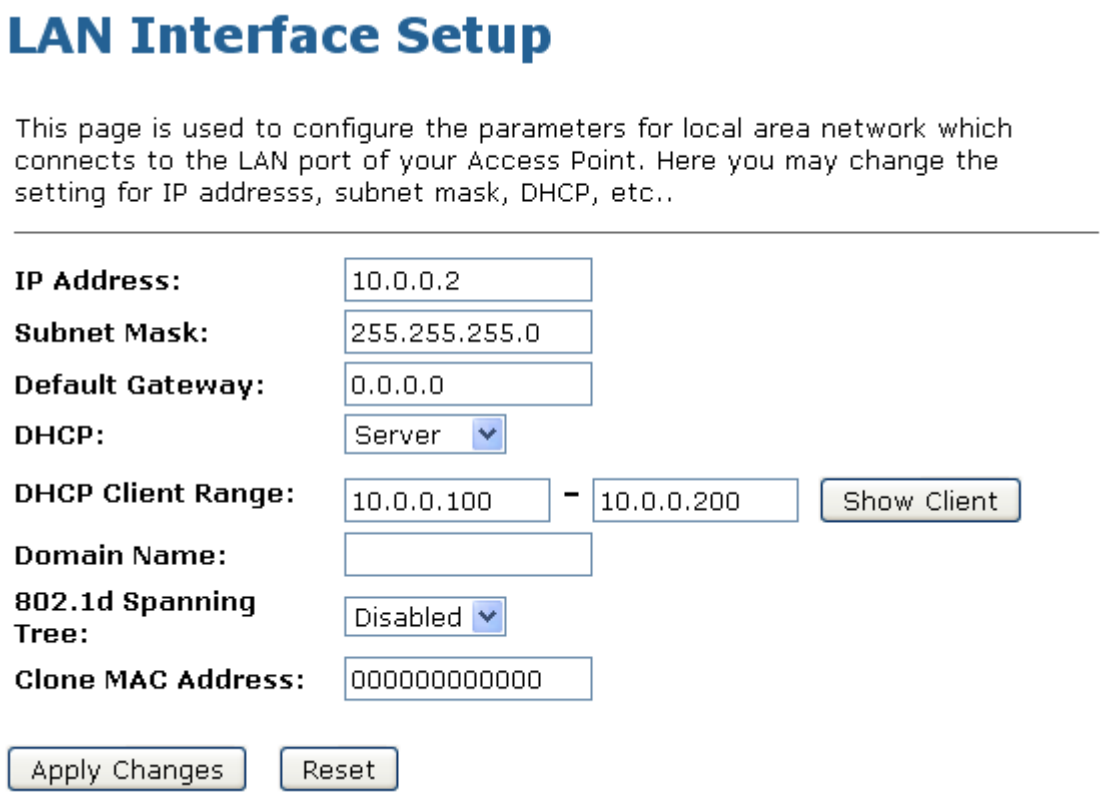
This chapter is to configure the parameters for local area network which connects to the LAN port of your Access Point. Here you may change the setting for IP address, subnet mask, DHCP, etc...

***Note**: You should only change the addressing details if your ISP asks you to, or if you are familiar with network configuration. In most cases, you will not need to make any changes to this configuration.*

11.1 LAN Interface Setup

To check the configuration of LAN Interface:

1. From the left-hand *Network Settings -> LAN Interface* menu. The following page is displayed:

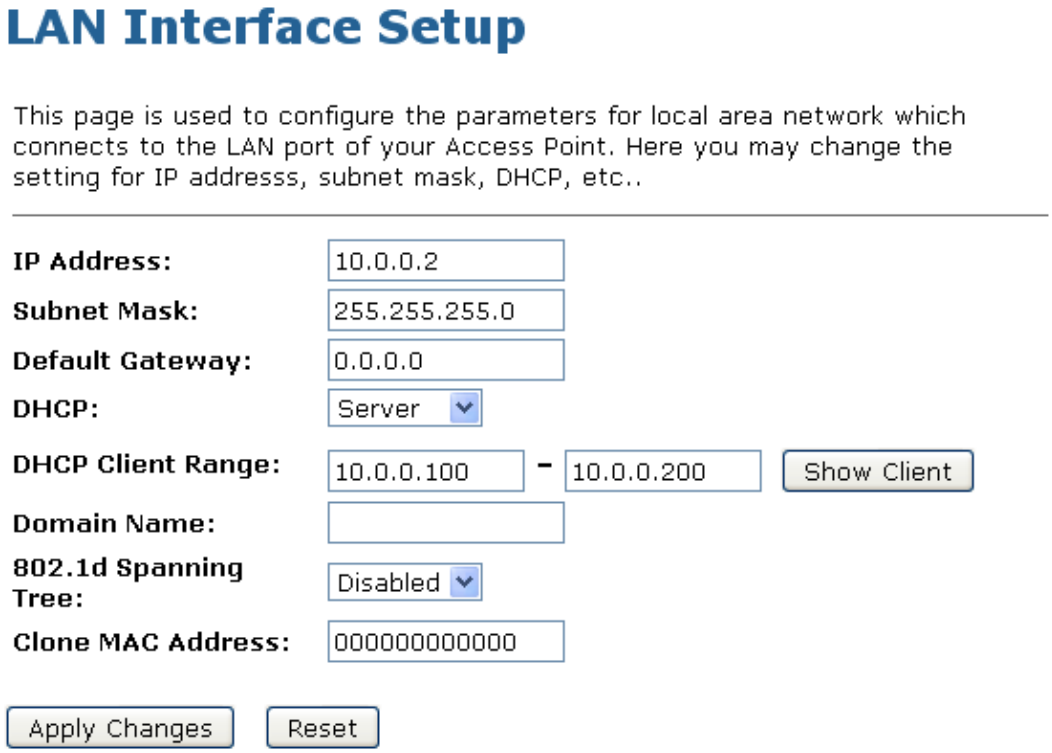


Field	Description
IP Address	**The LAN IP address** **Default: 192.168.1.254**
Subnet Mask	**The LAN netmask** **Default: 255.255.255.0**
Default Gateway	**The LAN Gateway** **Default: 0.0.0.0**
DHCP	**DHCP Type: Disable, DHCP Client or Server** **Default: DHCP Server**
DHCP Client Range	**Specify the starting/ending IP address of the IP address pool.** **Default Start IP: 192.168.1.100** **Default Ending IP: 192.168.1.200**
Show Client	**DHCP client computers/devices connected to the device will have their information displayed in the DHCP Client List table. The table will show the IP Address, MAC Address, and Expired Time of the DHCP lease for each client computer/device.**
Domain Name	**A domain name is a user-friendly name used in place of its associated IP address. Domain names must be unique; their assignment is controlled by the Internet Corporation for Assigned Names and Numbers (ICANN). Domain names are a key element of URLs, which identify a specific file at a web site.**
802.1d Spanning Tree	**Enable or Disable Spanning Tree**
Clone MAC Address	**MAC Spoofing on LAN** **Default: 000000000000**

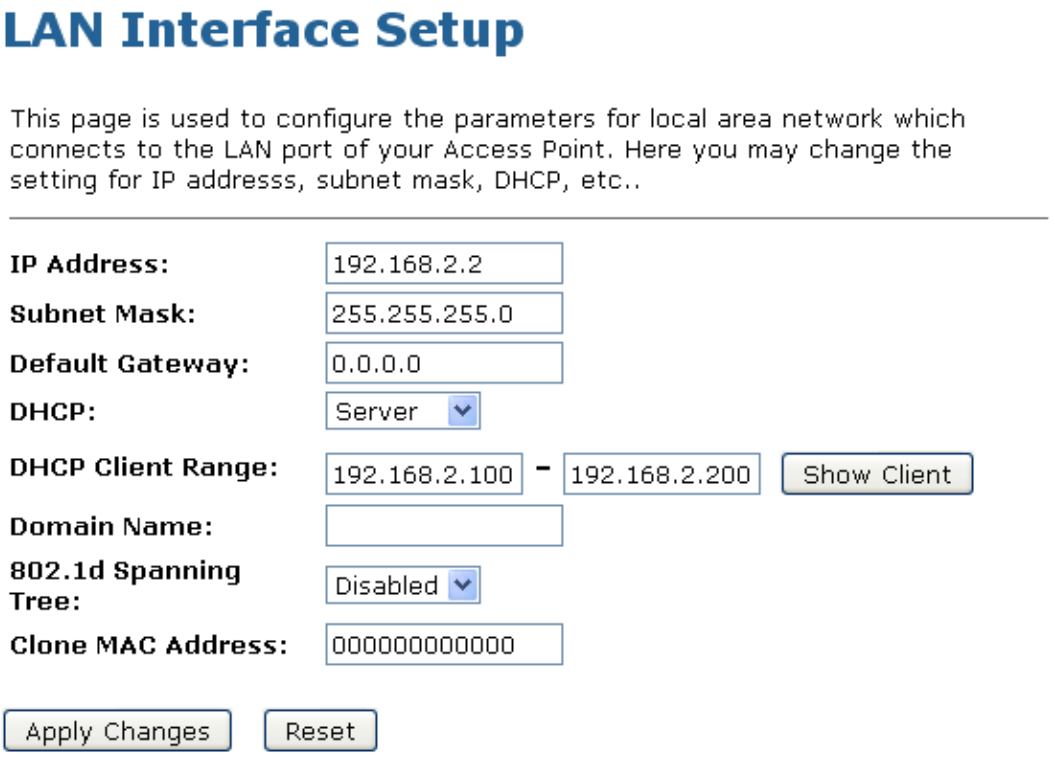
11.2 Changing the LAN IP address and subnet mask

To check the configuration of LAN Interface:

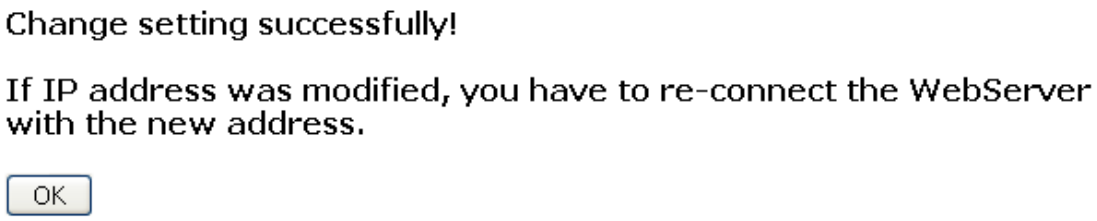
1. From the left-hand *Network Settings -> LAN Interface* menu. The following page is displayed:



2. Type IP Address and *Change default LAN port IP address*.
3. Click in the *IP Address and Subnet Mask* box and type a new IP Address and Subnet Mask.
4. Change the *default DHCP Client Range*.
5. Click *Apply Changes*.



6. The primary IP address is being changed to 192.168.2.2 netmask 255.255.255.0. Please go to http://192.168.2.2 to continue. Your browser communicates with the web server via the LAN connection, and changing the IP address may disrupt this.



You may also need to renew your DHCP lease:

Windows 95/98

a. Select **Run...** from the **Start** menu.

b. Enter **winipcfg** and click **OK**.

c. Select your ethernet adaptor from the pull-down menu

d. Click **Release All** and then **Renew All**.

e. **Exit** the winipcfg dialog.

Windows NT/Windows 2000/Windows XP

a. Bring up a command window.

b. Type **ipconfig /release** in the command window.

c. Type **ipconfig /renew**.

d. Type **exit** to close the command window.

Linux

a. Bring up a shell.

b. Type **pump -r** to release the lease.

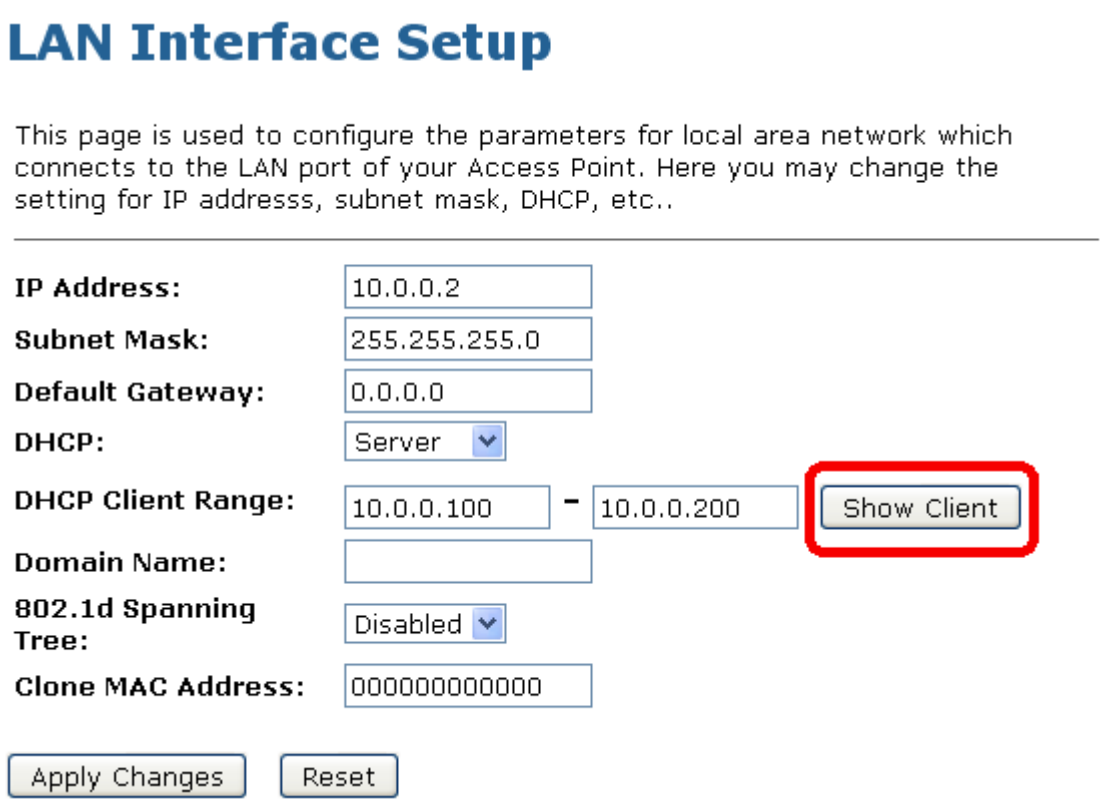
c. Type **pump** to renew the lease.

***Note**: If you change the LAN IP address of the device while connected through your Web browser, you will be disconnected. You must open a new connection by entering your new LAN IP address as the URL.*

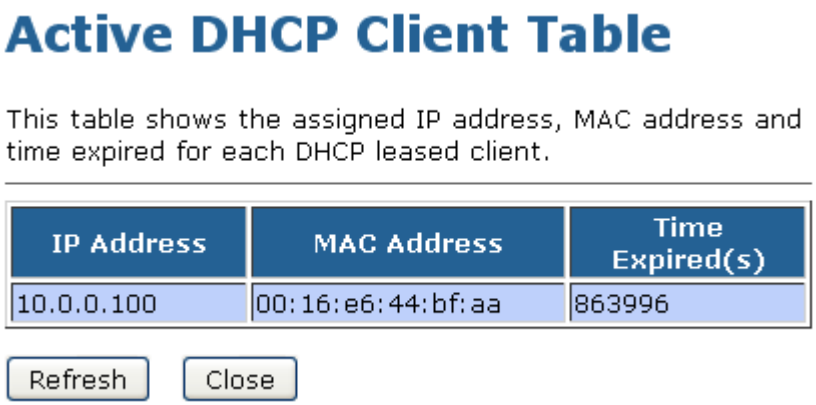
11.3 Show Client

To the IP Address, MAC Address, and Expired Time of the DHCP lease for each client computer/device:

1. From the left-hand *Network Settings -> LAN Interface* menu. The following page is displayed:



2. Click on *Show Client* button. The following page is displayed:



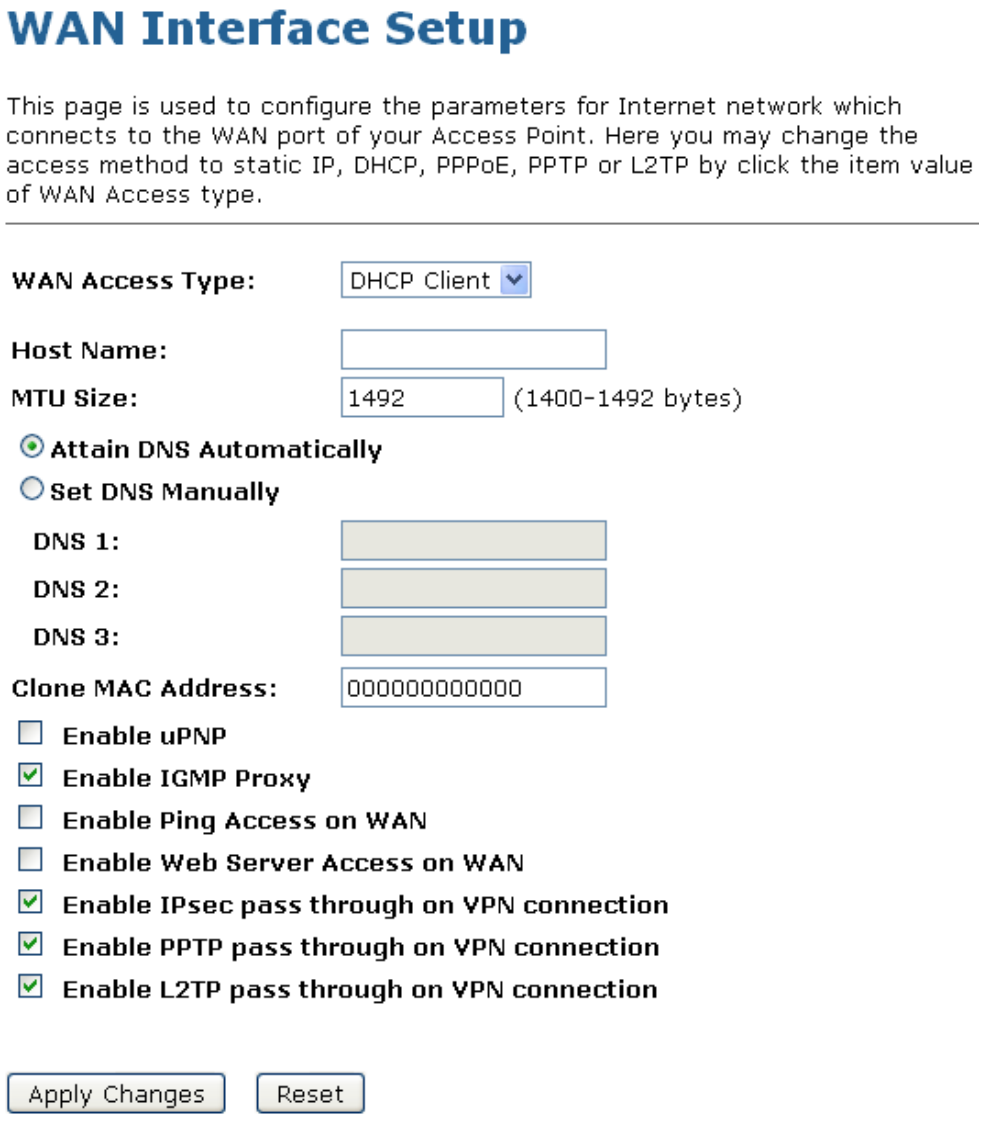
12. WAN Interface

This chapter describes how to configure the way that your device connects to the Internet. Your ISP determines what type of Internet access you should use and provides you with any information that you need in order to configure the Internet access to your device.

Wireless Gateway supports five methods of obtaining the WAN IP address:

Option	Description
Static IP	**Choose this option if you are a leased line user with a fixed IP address.**
DHCP Client	**Choose this option if you are connected to the Internet through a Cable modem line.**
PPPoE	**Choose this option if you are connected to the Internet through a DSL line**
PPTP	**Choose this option if you are connected to the PPTP Server**
L2TP	**Choose this option if you are connected to the L2TP Server**

1. From the left-hand *Network Settings -> WAN Interface* menu. The following page is displayed:



Option		Description
WAN Access Type	**Static IP**	**Choose this option if you are a leased line user with a fixed IP address.**
	DHCP Client	**Choose this option if you are connected to the Internet through a Cable modem line.**
	PPPoE	**Choose this option if you are connected to the Internet through a DSL line**
	PPTP	**Choose this option if you are connected to the PPTP Server**
	L2TP	**Choose this option if you are connected to the L2TP Server**
Host Name		**The name of the DHCP host**
IP Address		**Check with your ISP provider**
Subnet Mask		**Check with your ISP provider**
Default Gateway		**Check with your ISP provider**
User Name		**User name for PPPoE registration recognized by the Internet service provider**
Password		**Password for PPPoE registration recognized by the Internet service provider**
Service Name		**Service Name for PPPoE registration recognized by the Internet service provider**
Connection Type	**Continuous**	**The connection is always on**
	Connect on Demand	**Enter the minutes after which the session must be disconnected, if no activity takes place**
	Manual	**Manually connect**
Idle Time		**Enter the minutes after which the session must be disconnected**
WAN Physical		**Dynamic IP or Static IP for PPP Connection**
MTU Size		**Specify the network MTU rate**
Attain DNS Automatically		**Obtain DNS server address automatically**
DNS 1 (Primary DNS Server)		**Check with your ISP provider**
DNS 2 (Secondary DNS Server)		**Check with your ISP provider**
DNS 3 (Third DNS Server)		**Check with your ISP provider**

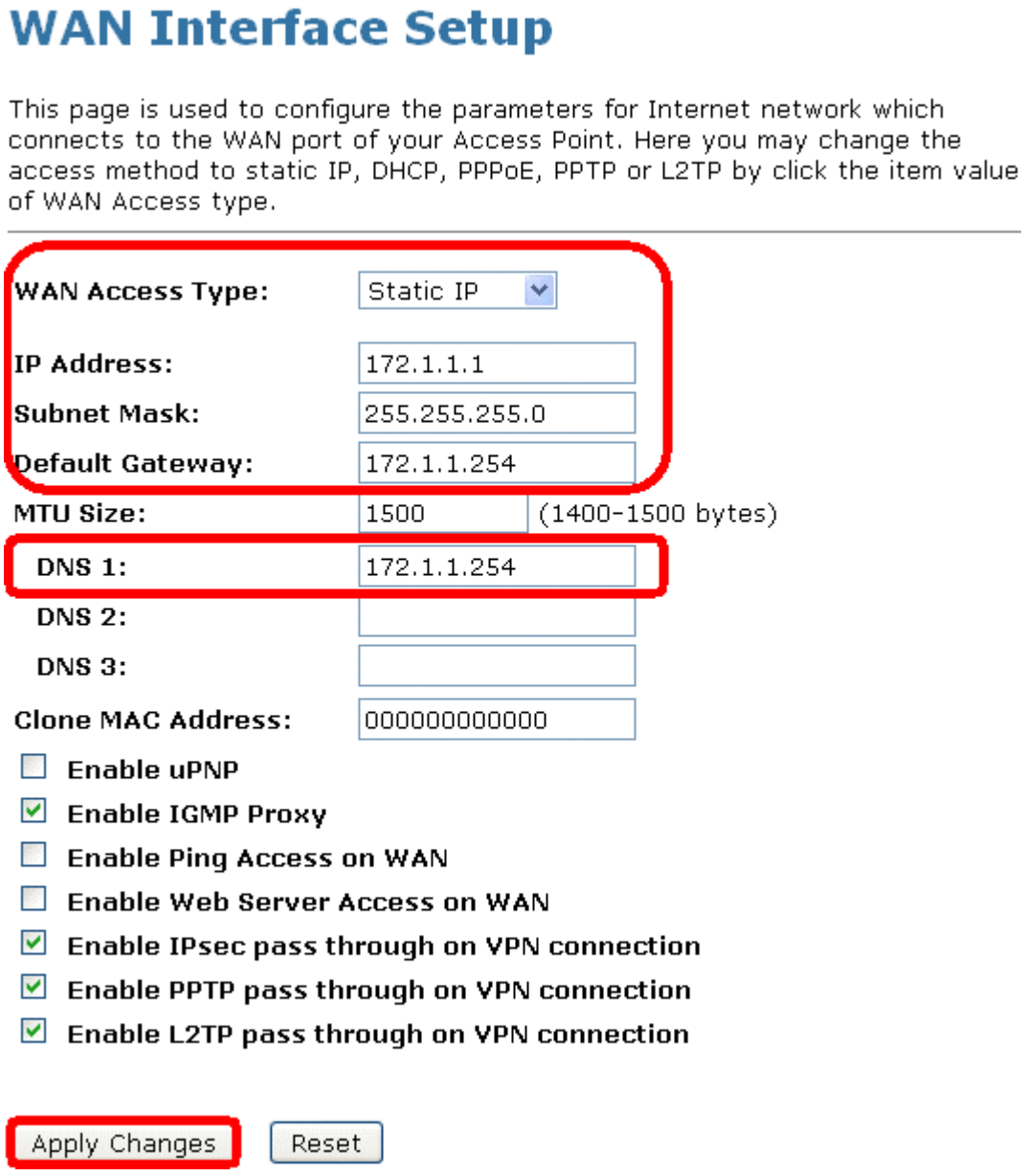
Option	Description
Clone MAC Address	**Clone MAC lets the device identify itself as another computer or device**
Enable uPNP	**Enable or Disable uPNP**
Enable IGMP Proxy	**Enable or Disable IGMP Proxy**
Enable Ping Access on WAN	**Enable or Disable Ping Access on WAN**
Enable Web Server Access on WAN	**Enable or Disable Web Server Access on WAN**
Enable IPsec pass through on VPN connection	**Enable or Disable IPsec pass through on VPN connection**
Enable PPTP pass through on VPN connection	**Enable or Disable PPTP pass through on VPN connection**
Enable L2TP pass through on VPN connection	**Enable or Disable L2TP pass through on VPN connection**

12.1 Configuring Static IP connection

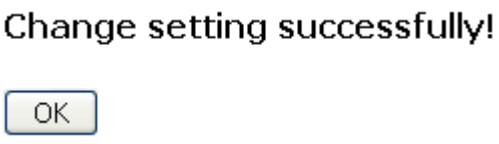
If you are a leased line user with a fixed IP address, enter in the IP address, subnet mask, gateway address, and DNS (domain name server) address(es) provided to you by your ISP.

If your ISP wants you to connect to the Internet using Static IP, follow the instructions below.

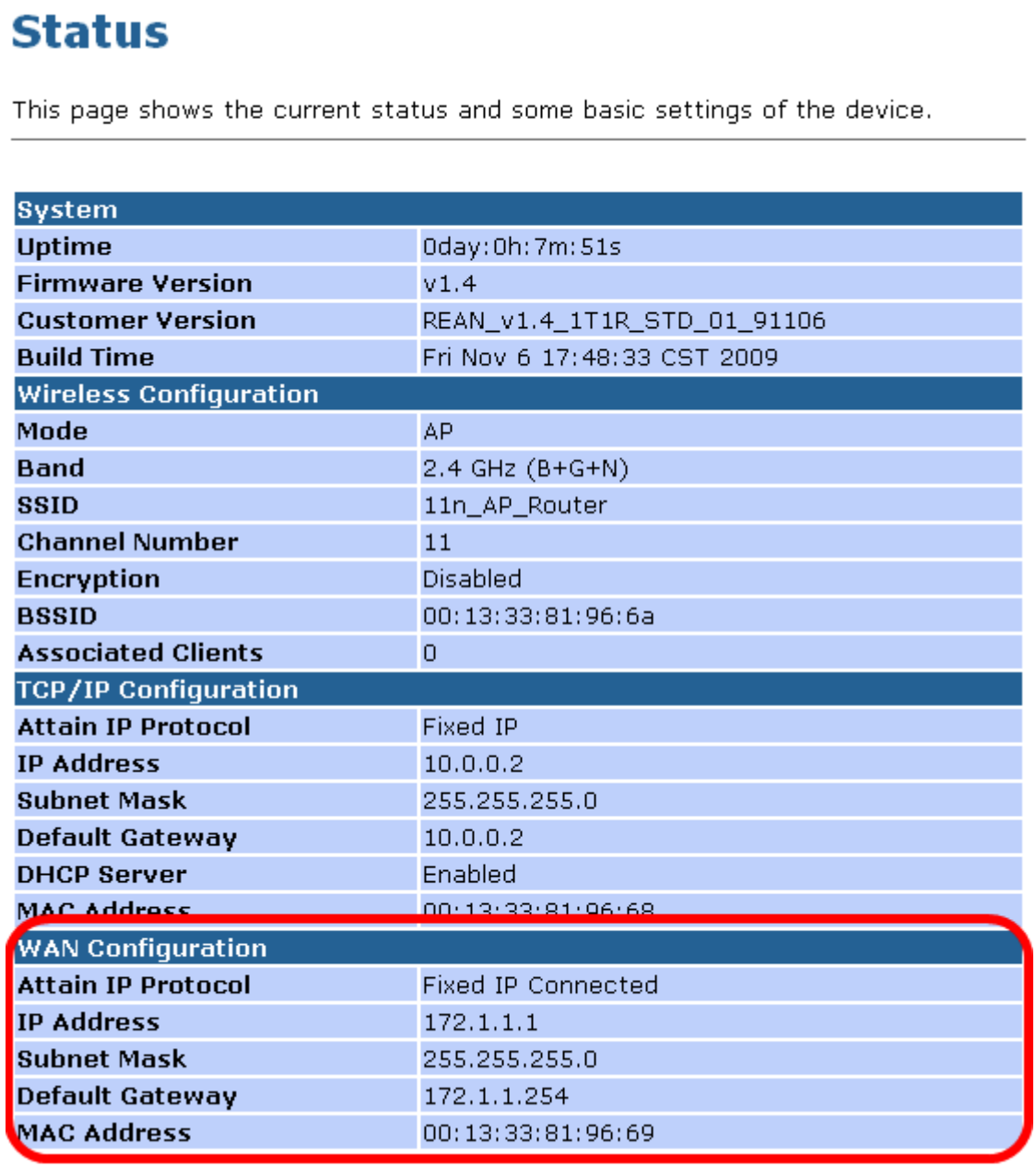
1. From the left-hand *Network Settings -> WAN Interface* menu. The following page is displayed:
2. From the *WAN Access Type* drop-down list, select *Static IP* setting.
3. Enter *WAN IP Address, WAN Subnet Mask, Default Gateway* and *DNS* which was given by Telecom or by your Internet Service Provider (ISP).
4. Click *Apply Changes*.



5. Click *OK*.



6. From the left-hand *Management -> Status* menu. The following page is displayed:
7. If you could see the *Attain IP Protocol* is shown ***Fixed IP***, you can have the Internet Access right now.



Status

This page shows the current status and some basic settings of the device.

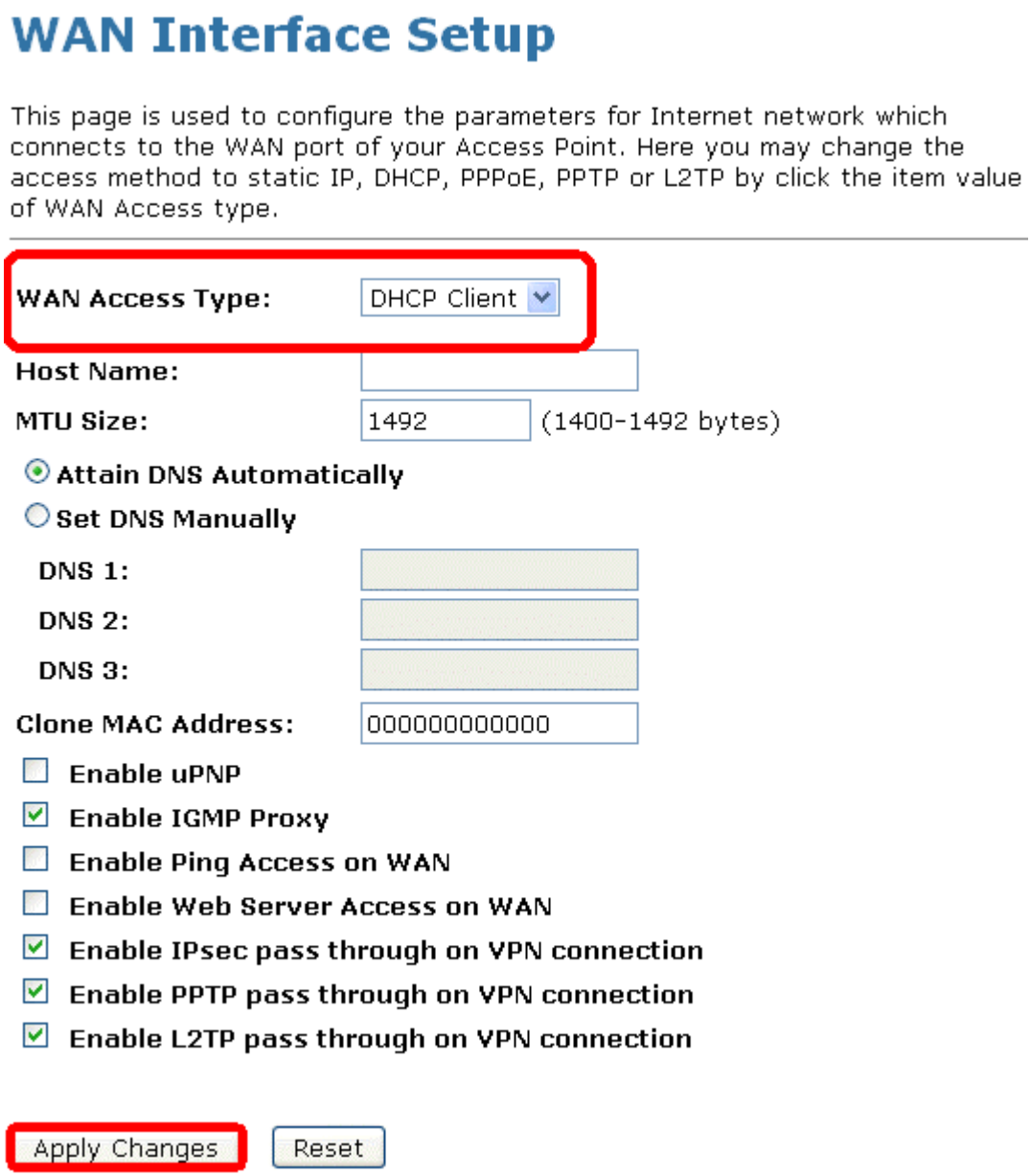
System	
Uptime	0day:0h:7m:51s
Firmware Version	v1.4
Customer Version	REAN_v1.4_1T1R_STD_01_91106
Build Time	Fri Nov 6 17:48:33 CST 2009
Wireless Configuration	
Mode	AP
Band	2.4 GHz (B+G+N)
SSID	11n_AP_Router
Channel Number	11
Encryption	Disabled
BSSID	00:13:33:81:96:6a
Associated Clients	0
TCP/IP Configuration	
Attain IP Protocol	Fixed IP
IP Address	10.0.0.2
Subnet Mask	255.255.255.0
Default Gateway	10.0.0.2
DHCP Server	Enabled
MAC Address	00:13:33:81:96:68
WAN Configuration	
Attain IP Protocol	Fixed IP Connected
IP Address	172.1.1.1
Subnet Mask	255.255.255.0
Default Gateway	172.1.1.254
MAC Address	00:13:33:81:96:69

12.2 Configuring DHCP Client connection

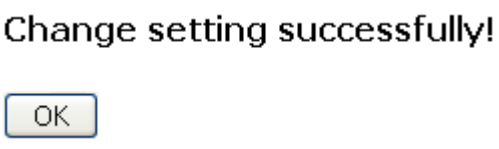
Dynamic Host Configuration Protocol (DHCP), Dynamic IP (Get WAN IP Address automatically). If you are connected to the Internet through a Cable modem line, then a dynamic IP will be assigned.

If your ISP wants you to connect to the Internet using DHCP Client, follow the instructions below.

1. From the left-hand *Network Settings -> WAN Interface* menu. The following page is displayed:
2. From the *WAN Access Type* drop-down list, select *DHCP Client* setting.
3. Click *Apply Changes*.



4. Click *OK*.



5. From the left-hand *Management -> Status* menu. The following page is displayed:
6. If you could see the *Attain IP Protocol* is shown ***DHCP***, you can have the Internet Access right now.

Status

This page shows the current status and some basic settings of the device.

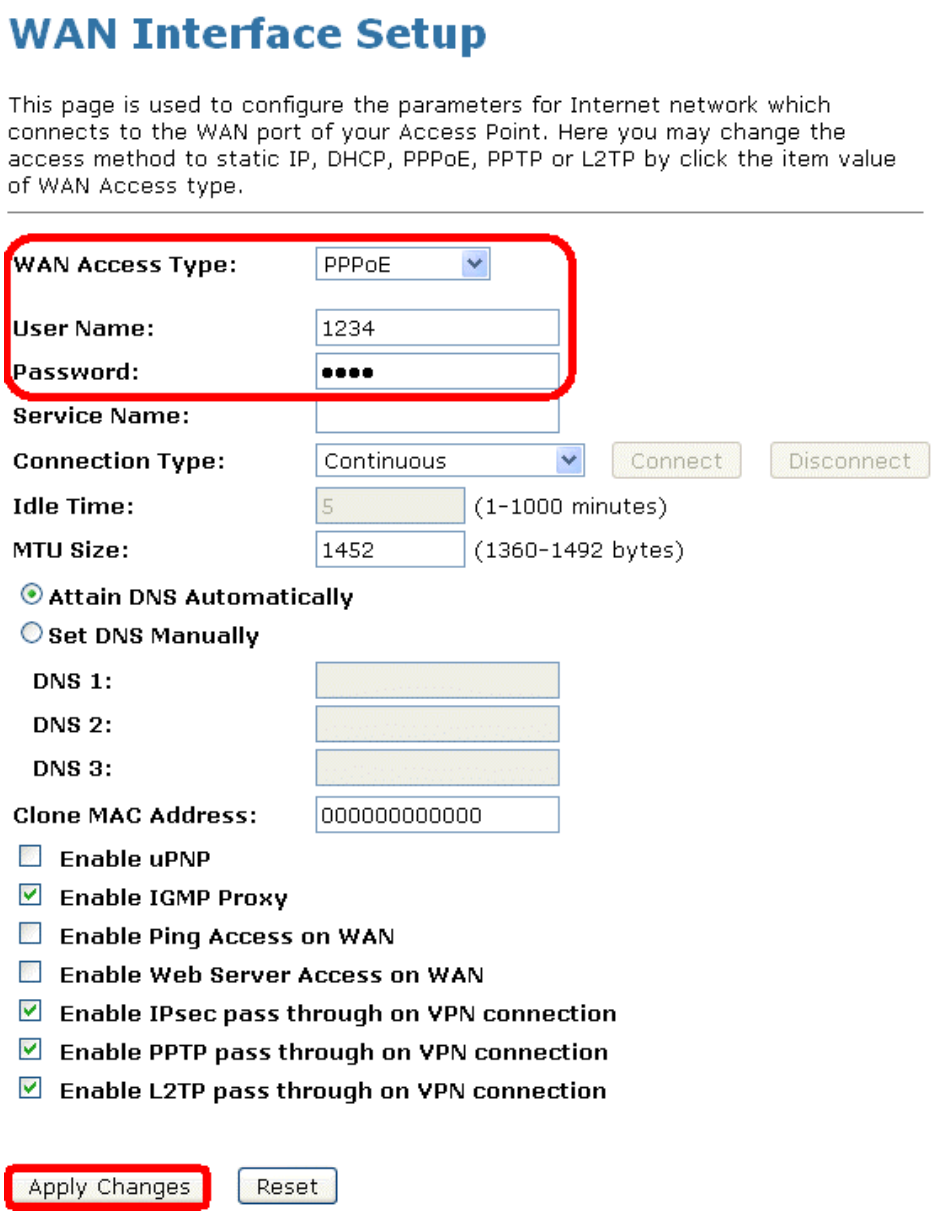
System	
Uptime	0day:0h:14m:58s
Firmware Version	v1.4
Customer Version	REAN_v1.4_1T1R_STD_01_91106
Build Time	Fri Nov 6 17:48:33 CST 2009
Wireless Configuration	
Mode	AP
Band	2.4 GHz (B+G+N)
SSID	11n_AP_Router
Channel Number	11
Encryption	Disabled
BSSID	00:13:33:81:96:6a
Associated Clients	0
TCP/IP Configuration	
Attain IP Protocol	Fixed IP
IP Address	10.0.0.2
Subnet Mask	255.255.255.0
Default Gateway	10.0.0.2
DHCP Server	Enabled
MAC Address	00:13:33:81:96:68
WAN Configuration	
Attain IP Protocol	DHCP
IP Address	192.168.10.17
Subnet Mask	255.255.255.0
Default Gateway	192.168.10.100
MAC Address	01:23:45:67:89:ab

12.3 Configuring PPPoE connection

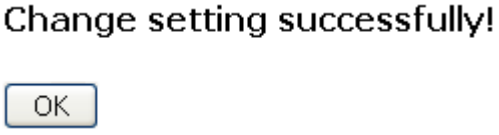
If your ISP's Internet service uses PPPoE you need to set up a PPP login account. The first time that you login to the Internet, your ISP will ask you to enter a username and password so they can check that you are a legitimate, registered Internet service user. Your device stores these authentication details, so you will not have to enter this username and password every time you login.

If your ISP wants you to connect to the Internet using PPP, follow the instructions below.

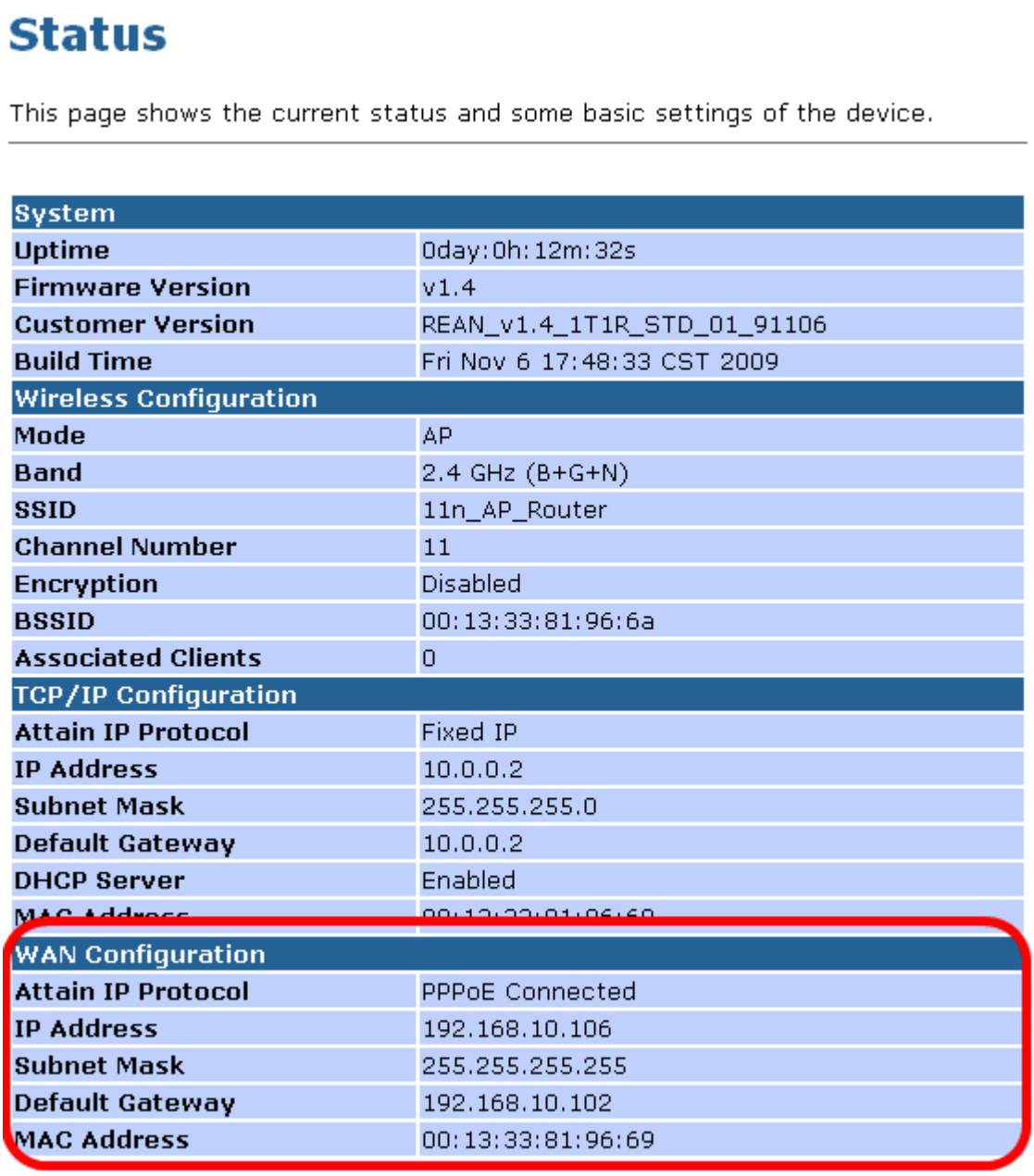
1. From the left-hand *Network Settings -> WAN Interface* menu. The following page is displayed:
2. From the *WAN Access Type* drop-down list, select *PPPoE* setting.
3. Enter *User Name/Password* provided by your ISP. Type them in the relevant boxes.
4. Click *Apply Changes*.



5. Click *OK*.



6. From the left-hand *Management -> Status* menu. The following page is displayed:
7. If you could see the *Attain IP Protocol* is shown ***PPPoE Connected***, you can have the Internet Access right now.



Status

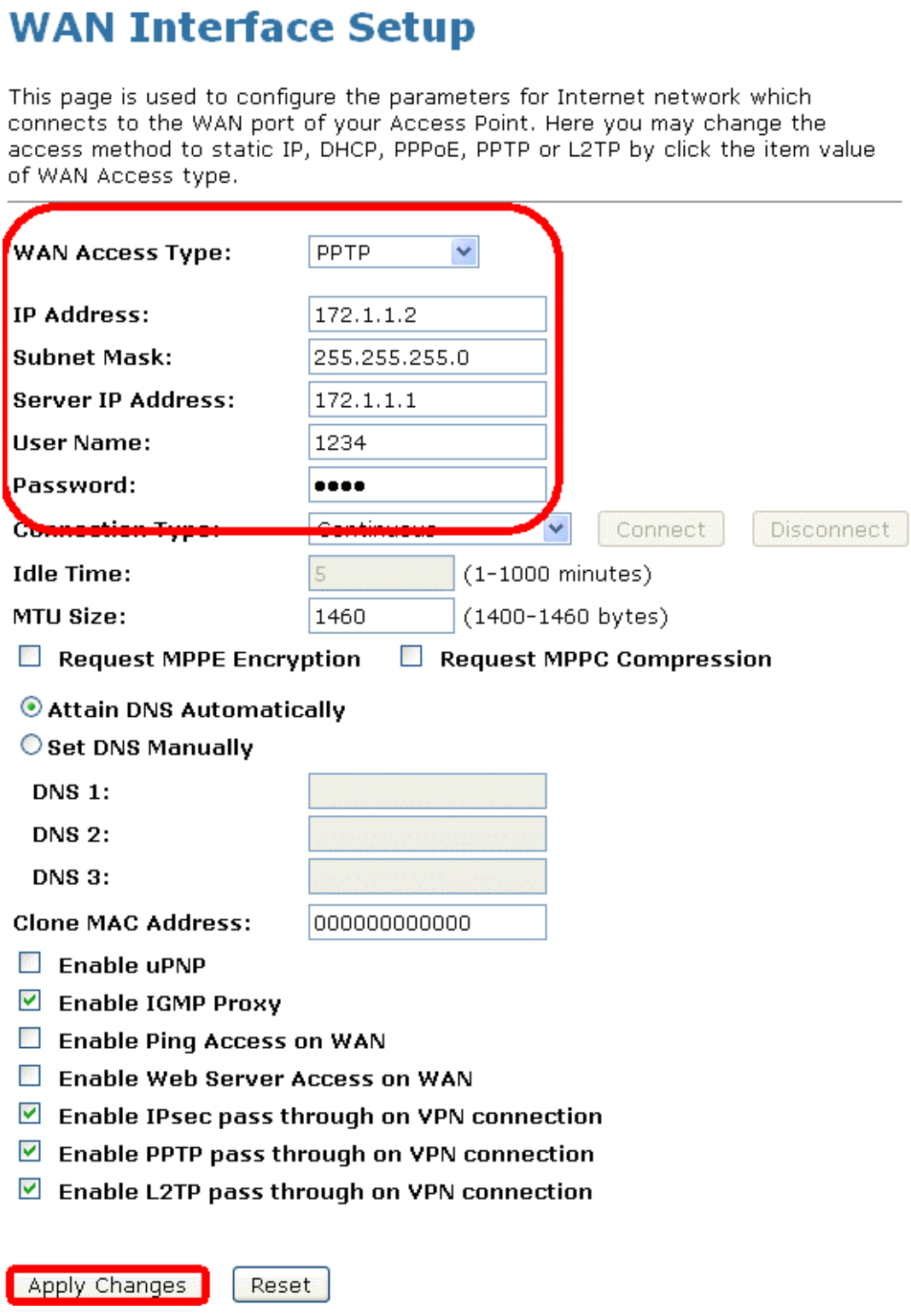
This page shows the current status and some basic settings of the device.

System	
Uptime	0day:0h:12m:32s
Firmware Version	v1.4
Customer Version	REAN_v1.4_1T1R_STD_01_91106
Build Time	Fri Nov 6 17:48:33 CST 2009
Wireless Configuration	
Mode	AP
Band	2.4 GHz (B+G+N)
SSID	11n_AP_Router
Channel Number	11
Encryption	Disabled
BSSID	00:13:33:81:96:6a
Associated Clients	0
TCP/IP Configuration	
Attain IP Protocol	Fixed IP
IP Address	10.0.0.2
Subnet Mask	255.255.255.0
Default Gateway	10.0.0.2
DHCP Server	Enabled
MAC Address	00:13:33:81:96:69
WAN Configuration	
Attain IP Protocol	PPPoE Connected
IP Address	192.168.10.106
Subnet Mask	255.255.255.255
Default Gateway	192.168.10.102
MAC Address	00:13:33:81:96:69

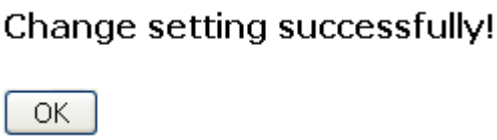
12.4 Configuring PPTP connection

If your ISP/Network Administrator wants you to connect to the Internet using PPTP, follow the instructions below.

1. From the left-hand *Network Settings -> WAN Interface* menu. The following page is displayed:
2. From the *WAN Access Type* drop-down list, select *PPTP* setting.
3. Enter *IP Address/Subnet Mask/Server IP Address/User Name/Password* provided by your ISP. Type them in the relevant boxes.
4. Click *Apply Changes*.



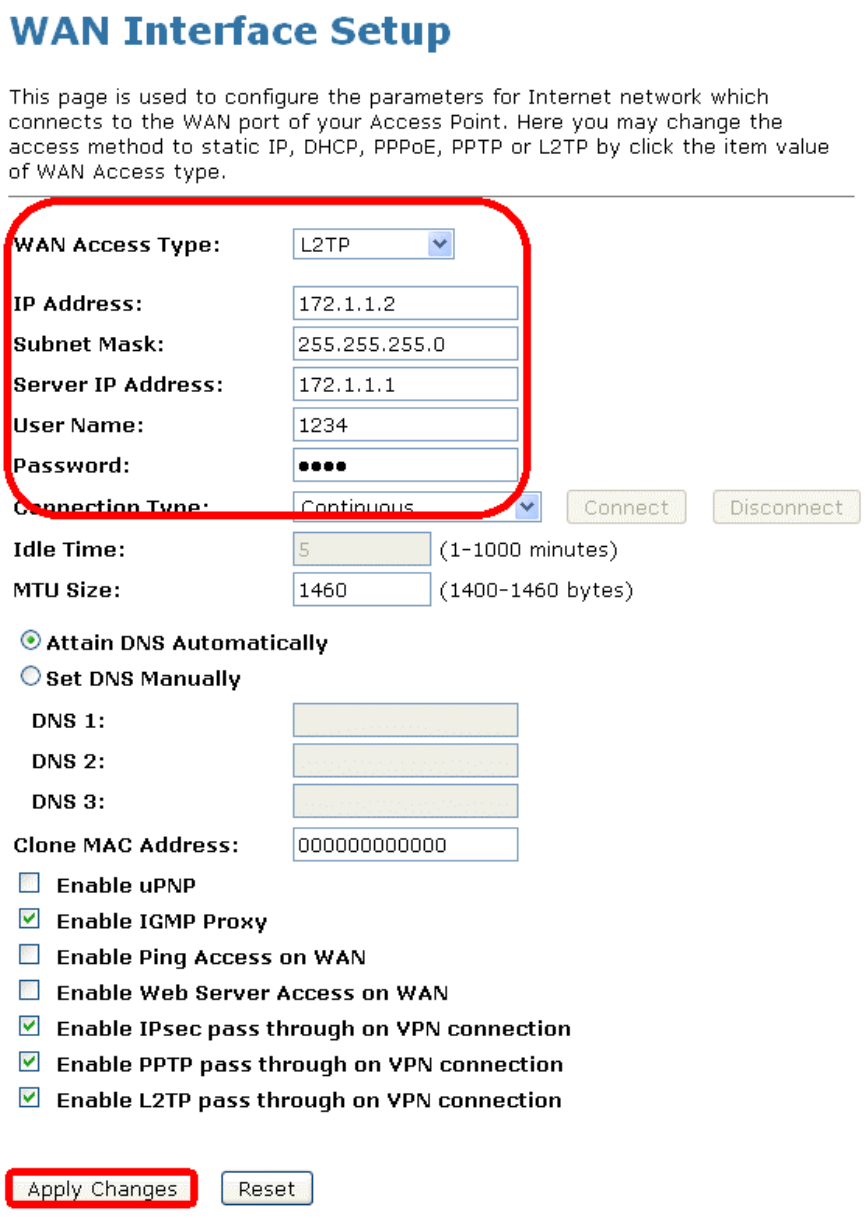
5. Click *OK*.



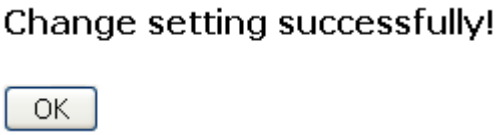
12.5 Configuring L2TP connection

If your ISP/Network Administrator wants you to connect to the Internet using L2TP, follow the instructions below.

1. From the left-hand *Network Settings -> WAN Interface* menu. The following page is displayed:
2. From the *WAN Access Type* drop-down list, select *L2TP* setting.
3. Enter *IP Address/Subnet Mask/Server IP Address/User Name/Password* provided by your ISP. Type them in the relevant boxes.
4. Click *Apply Changes*.



5. Click *OK*.

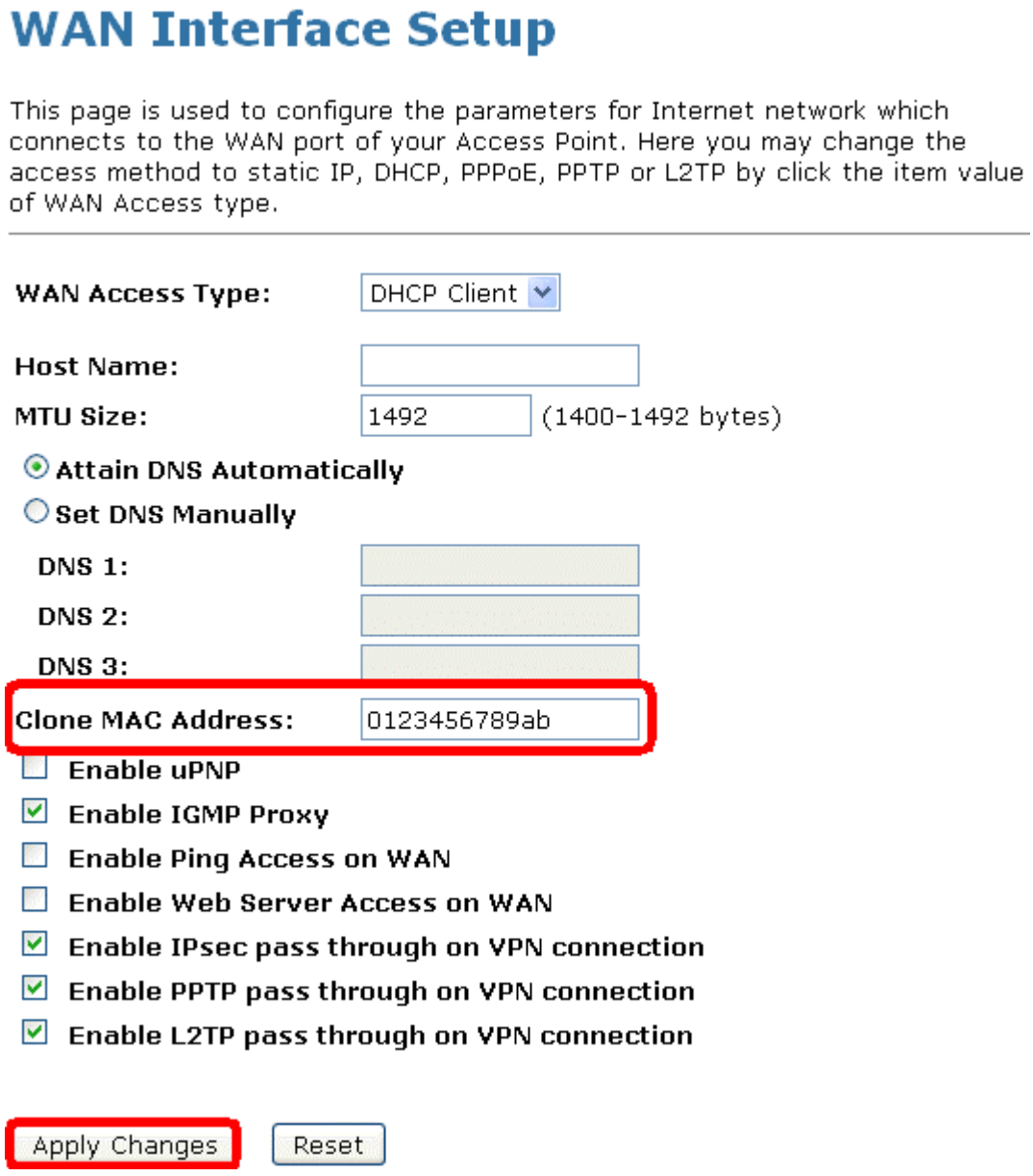


12.6 Clone MAC Address

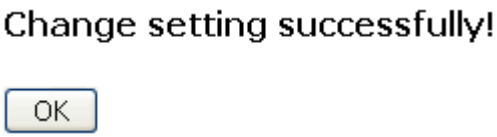
Some particularly ISPs do not want you to have a home network and have a DSL/Cable modem that allows only 1 MAC to talk on the internet. If you change network cards, you have to call them up to change the MAC. The Wireless Gateway can it's MAC to computer's one that was originally set up for such an ISP.

This page allows you to enable or disable *Clone MAC Address* option.

1. From the left-hand *Network Settings -> WAN Interface* menu. The following page is displayed:
2. Enter the MAC for example 0123456789ab that you want to be instead of in the *Clone MAC Address* field.
3. If you enter 12 digits of 0 in the *Clone MAC Address* field, it'll disable *Clone MAC Address* function.
4. Click *Apply Changes*.



5. Click *OK*.



6. From the left-hand *Management -> Status* menu. The following page is displayed:
7. If you could see the *WAN Configuration -> MAC Address* is changed to the one that you configured.

Status

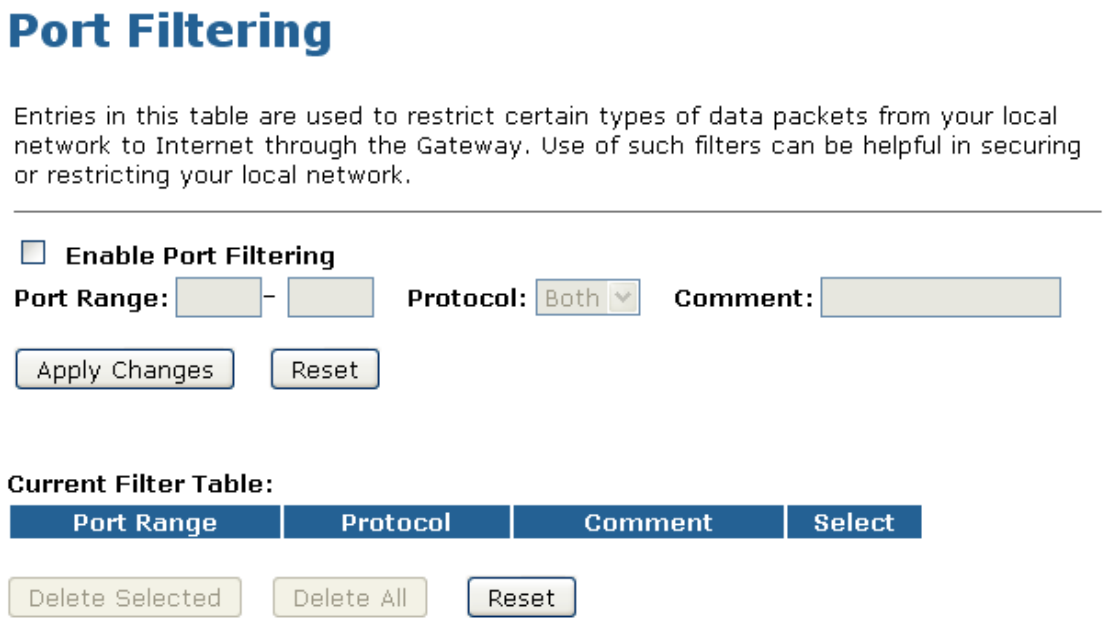
This page shows the current status and some basic settings of the device.

System	
Uptime	0day:0h:14m:58s
Firmware Version	v1.4
Customer Version	REAN_v1.4_1T1R_STD_01_91106
Build Time	Fri Nov 6 17:48:33 CST 2009
Wireless Configuration	
Mode	AP
Band	2.4 GHz (B+G+N)
SSID	11n_AP_Router
Channel Number	11
Encryption	Disabled
BSSID	00:13:33:81:96:6a
Associated Clients	0
TCP/IP Configuration	
Attain IP Protocol	Fixed IP
IP Address	10.0.0.2
Subnet Mask	255.255.255.0
Default Gateway	10.0.0.2
DHCP Server	Enabled
MAC Address	00:13:33:81:96:68
WAN Configuration	
Attain IP Protocol	DHCP
IP Address	192.168.10.17
Subnet Mask	255.255.255.0
Default Gateway	192.168.10.100
MAC Address	01:23:45:67:89:ab

13. Port Filtering

Entries in *Current Filter Table* are used to restrict certain ports and types of data packets from your local network to Internet through the Gateway. Use of such filters can be helpful in securing or restricting your local network.

1. From the left-hand *Firewall -> Port Filtering* menu. The following page is displayed:



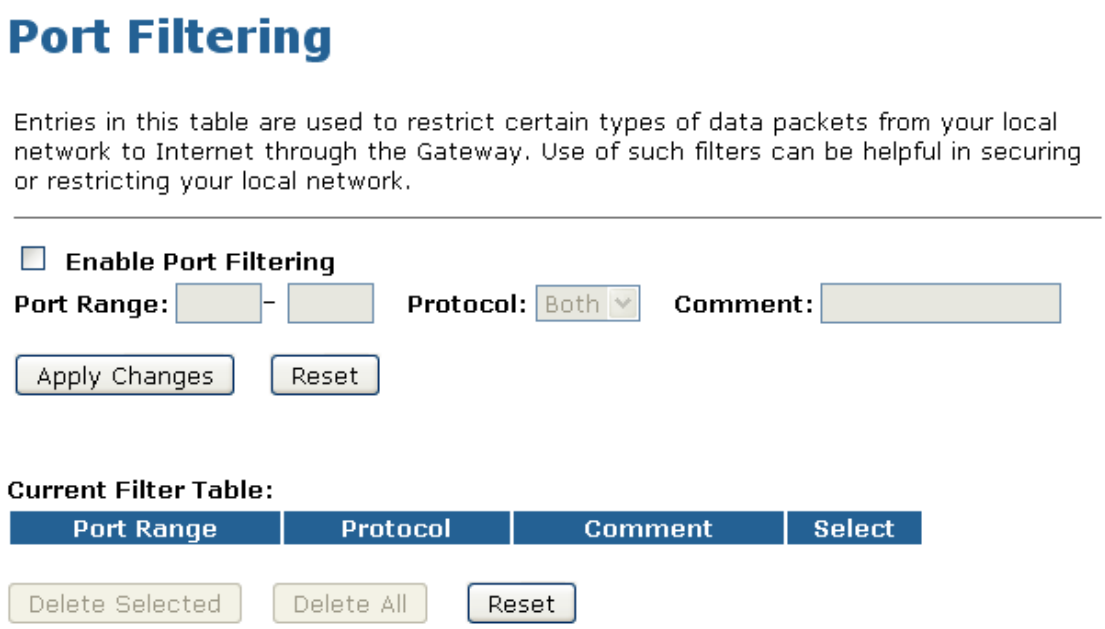
Option	Description
Enable Port Filtering	**Enable/Disable the WAN packet filter.** **Default setting is Disable.**
Port Range	**Enter the port range to be filtered for both Outbound and Inbound packet**
Protocol	**Select the Protocol to be filtered for both Outbound and Inbound packet** **Both: To filter both TCP and UDP protocol** **TCP: To filter only TCP protocol** **UDP: filter only UDP protocol**
Comment	**Fill in the note for manager what the purpose of certain port filtering rule**
Current Filter Table	**The Port Filters that was created is listed here**

***Note**: You must ensure that the single port or range specified does not overlap with a port or range for an existing common or custom application.*

13.1 Port filtering for TCP port 80

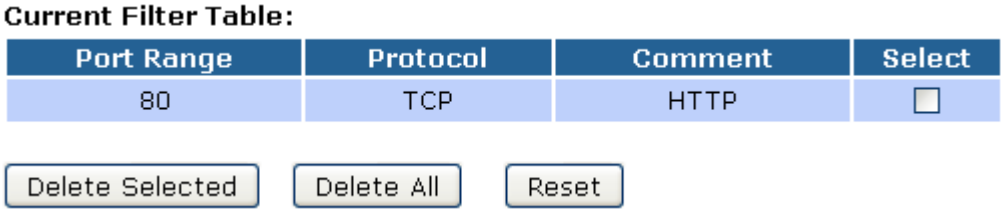
Please follow example below to deny the TCP port 80 for both Outbound and Inbound packet.

1. From the left-hand *Firewall -> Port Filtering* menu. The following page is displayed:



2. Check the option *Enable Port Filtering* to enable the port filtering.
3. Enter *80* and *80* in *Port Range* field.
4. From the *Protocol* drop-down list, select *TCP* setting.
5. Enter HTTP in *Comment* field.
6. Click *Apply Changes*.

7. Now the port filter that you created has been added and listed in the *Current Filter Table*.
8. Now the TCP port for both Outbound and Inbound packet has been denied.

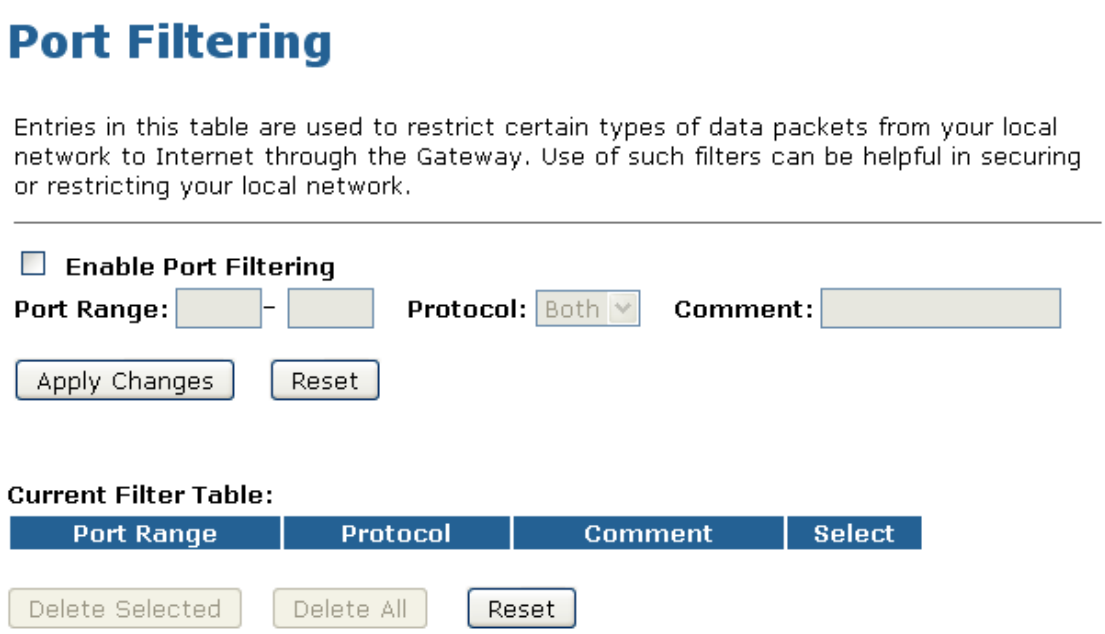


Now you cannot visit any web site due to the TCP port 80 has been blocked by the Port Filtering rule that created.

13.2 Port filtering for UDP port 53

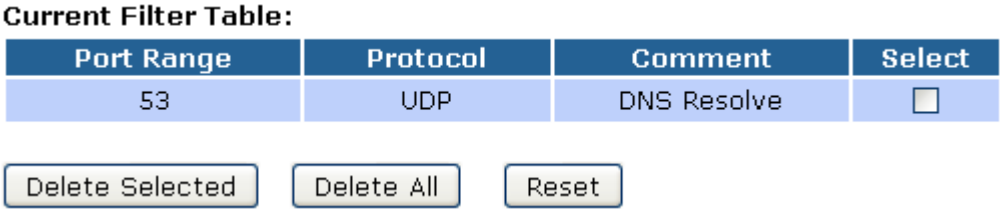
Please follow example below to deny the UDP port 53 for both Outbound and Inbound packet.

1. From the left-hand *Firewall -> Port Filtering* menu. The following page is displayed:



2. Check the option *Enable Port Filtering* to enable the port filtering.
3. Enter *53* and *53* in *Port Range* field.
4. From the *Protocol* drop-down list, select *UDP* setting.
5. Enter DNS Resolve in *Comment* field.
6. Click *Apply Changes*.

7. Now the port filter that you created has been added and listed in the *Current Filter Table*.
8. Now the UDP port 53 for both Outbound and Inbound packet has been denied.



Now you cannot visit any web site by domain due to the UDP port 53 has been blocked by the Port Filtering rule that created.

You can enter the IP Address of that web site to visit.

14. IP Filtering

Entries in this table are used to restrict certain types of data packets from your local network to Internet through the Gateway. Use of such filters can be helpful in securing or restricting your local network.

The IP filter feature enables you to create rules that control the forwarding of incoming and outgoing data between the LAN and WAN side.

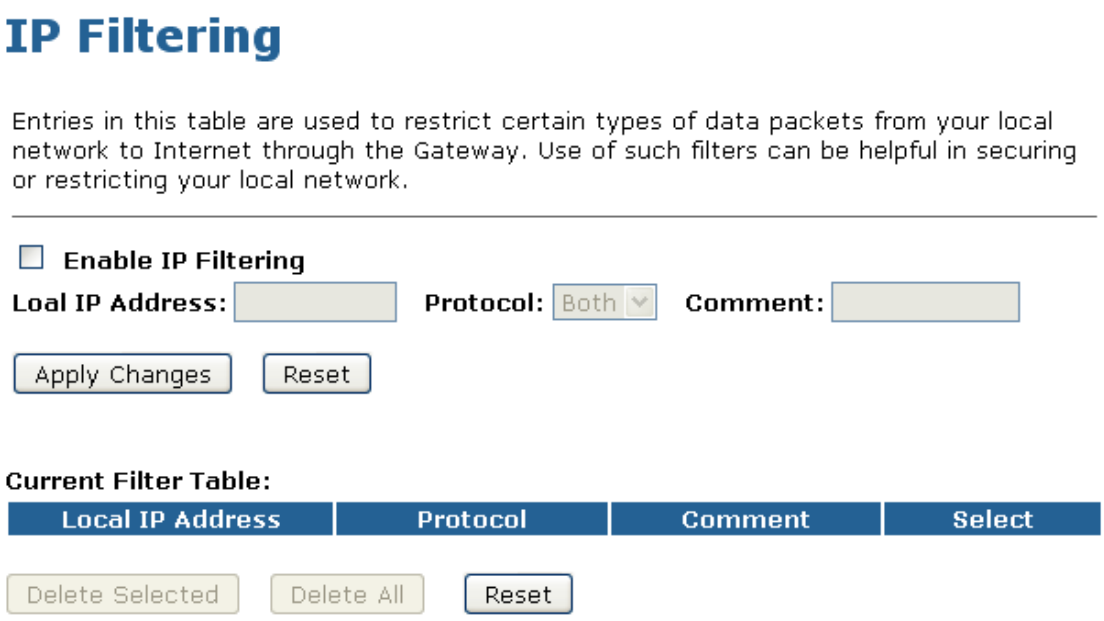
You can create IP filter rules to block attempts by certain computers on your LAN to access certain types of data or Internet locations. You can also block accesses to your LAN computers from the WAN side.

When you define an IP filter rule and enable the feature, you instruct the ADSL/Ethernet router to examine data packets to determine whether they meet criteria set forth in the rule. The criteria can include the network or internet protocol, the packet carries the direction in which it is traveling (for example, from the LAN to the WAN and vice versa).

If the packet matches the criteria established in a rule, the packet can either be accepted (forwarded towards its destination), or denied (discarded), depending on the action specified in the rule.

The IP Filter Configuration page provides the capability to enable/disable the IP filter feature and the IP Filter rule entries for all currently established rules.

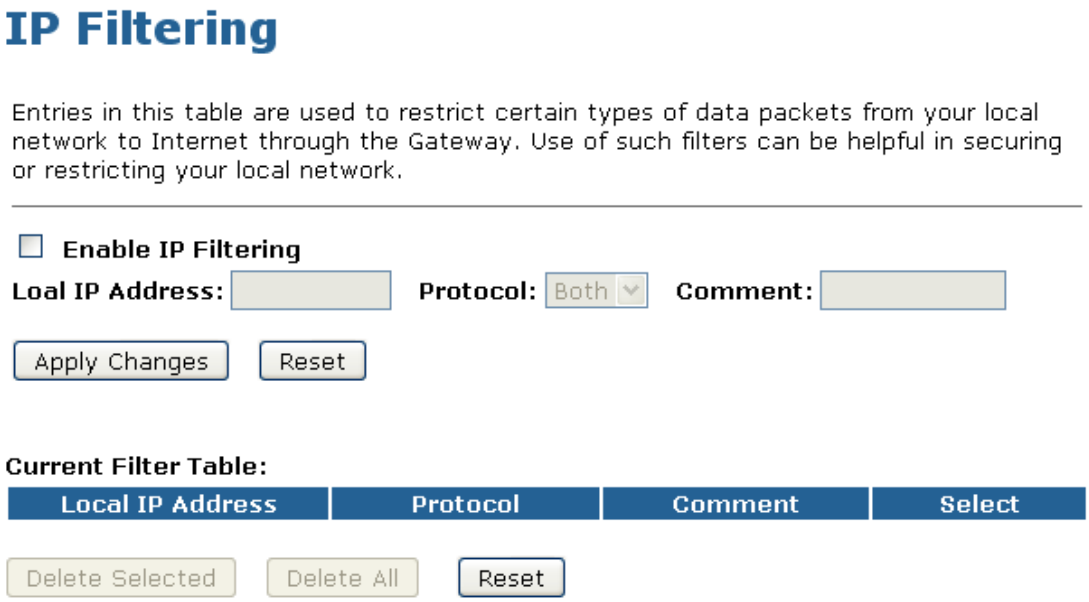
1. From the left-hand *Firewall -> IP Filtering* menu. The following page is displayed:



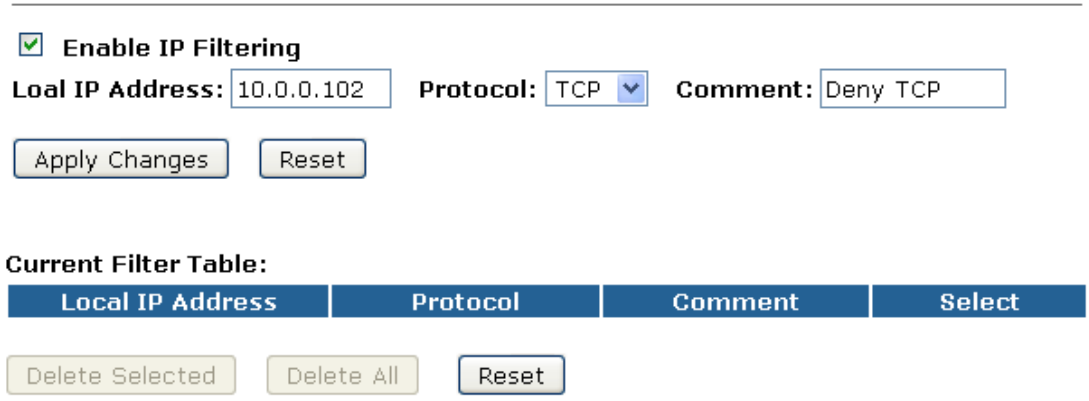
14.1 IP filtering for TCP with specified IP

Please follow example below to deny the TCP protocol for specified IP.

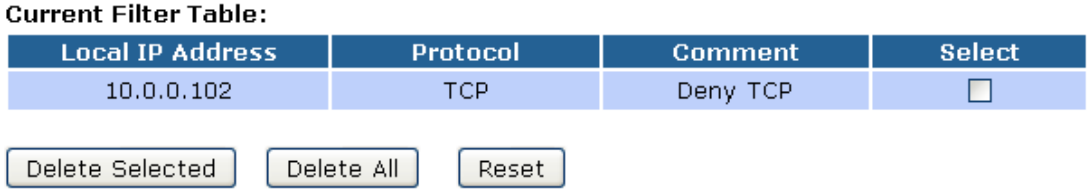
1. From the left-hand *Firewall -> IP Filtering* menu. The following page is displayed:



2. Check the option *Enable IP Filtering* to enable the IP Filtering.
3. Enter the IP Address that you want to be denied in *Loal IP Address* field.
4. From the *Protocol* drop-down list, select *TCP* setting.
5. Enter any comment in *Comment* field.
6. Click *Apply Changes*.



7. Now the IP Filter that you created has been added and listed in the *Current Filter Table*.
8. Now the TCP protocol for both Outbound and Inbound packet has been denied.

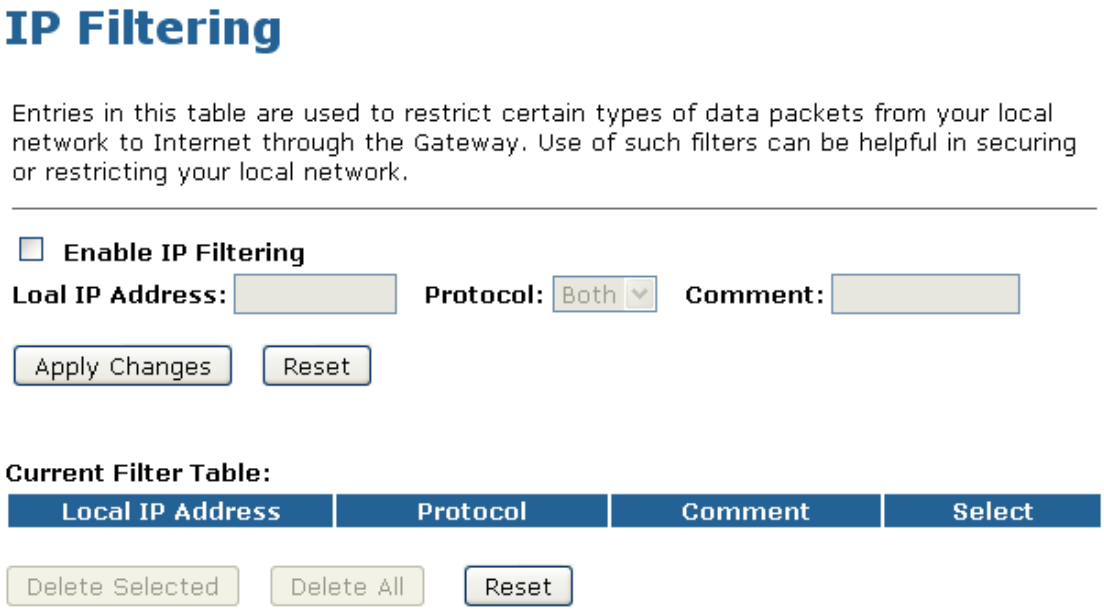


Now The Local IP Address for example 10.0.0.102 that listed in the Current Filter Table cannot visit any application that use TCP protocol for example web site due to the Protocol TCP has been blocked by the IP Filtering rule that created.

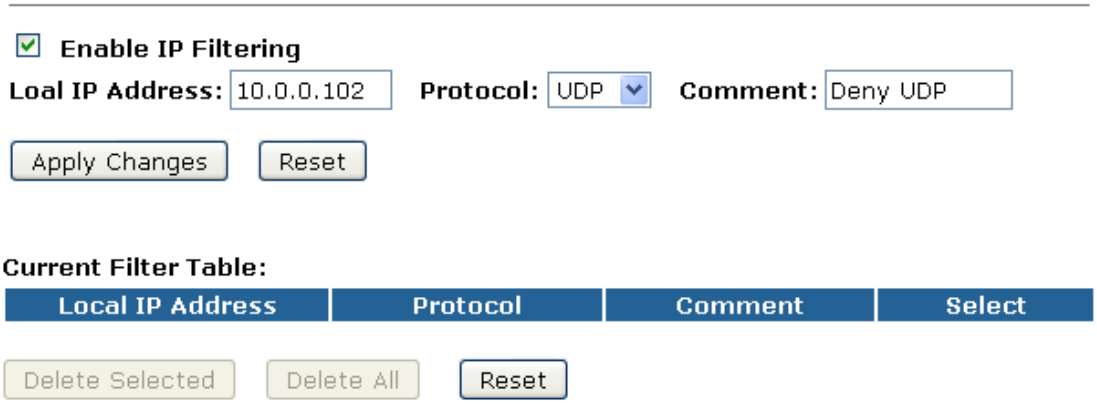
14.2 IP filtering for UDP with specified IP

Please follow example below to deny the UDP protocol for specified IP.

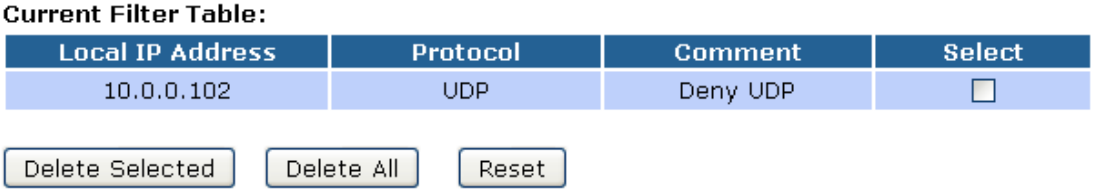
1. From the left-hand *Firewall -> IP Filtering* menu. The following page is displayed:



2. Check the option *Enable IP Filtering* to enable the IP Filtering.
3. Enter the IP Address that you want to be denied in *Loal IP Address* field.
4. From the *Protocol* drop-down list, select *UDP* setting.
5. Enter any comment in *Comment* field.
6. Click *Apply Changes*.



7. Now the IP Filter that you created has been added and listed in the *Current Filter Table*.
8. Now the UDP protocol for both Outbound and Inbound packet has been denied.

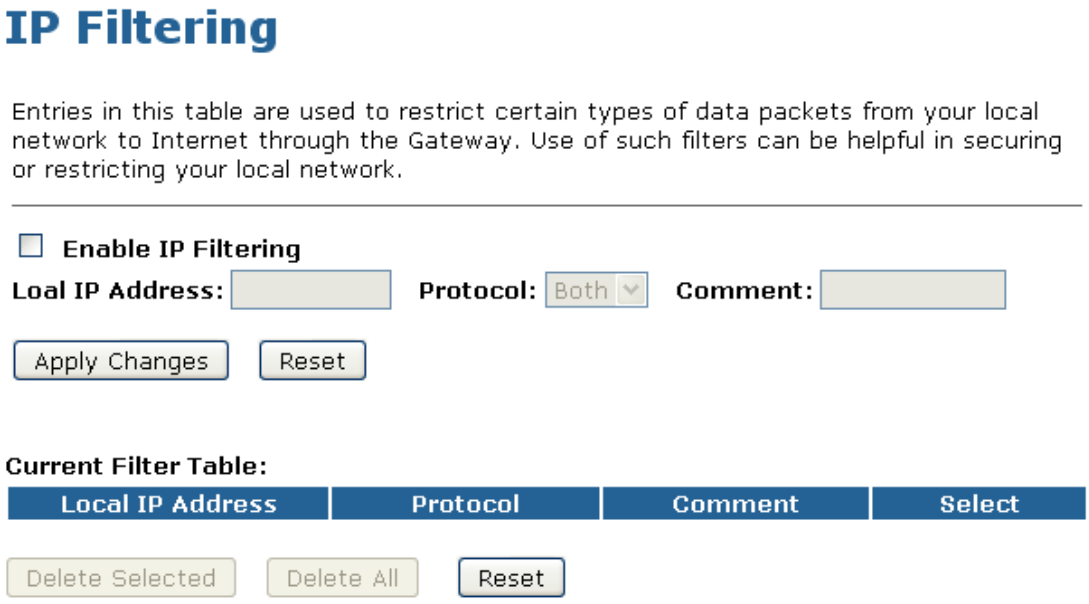


Now The Local IP Address for example 10.0.0.102 that listed in the Current Filter Table cannot visit any application that use UDP protocol for example TFTP Service due to the Protocol UDP has been blocked by the IP Filtering rule that created.

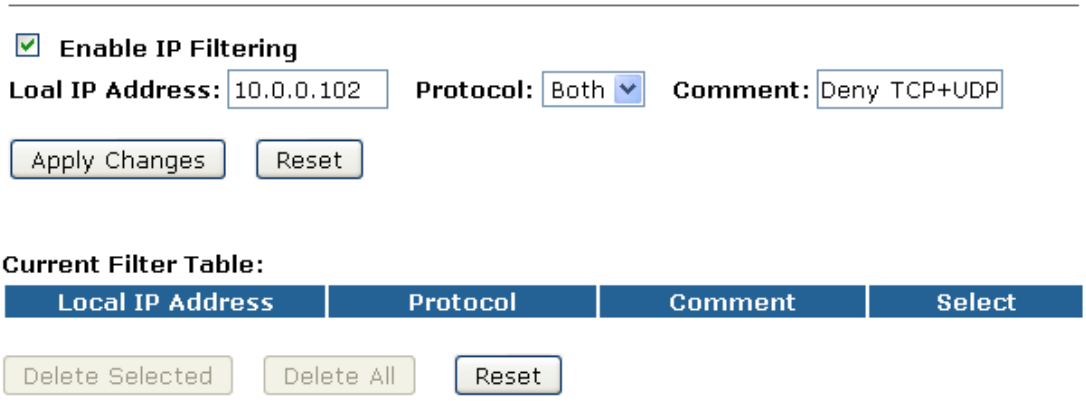
14.3 IP filtering for both TCP and UDP with specified IP

Please follow example below to deny the both TCP and UDP protocol for specified IP.

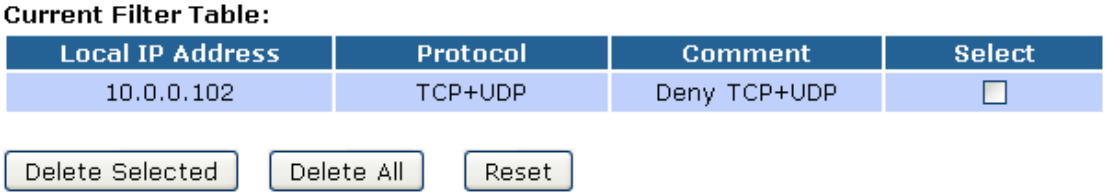
1. From the left-hand *Firewall -> IP Filtering* menu. The following page is displayed:



2. Check the option *Enable IP Filtering* to enable the IP Filtering.
3. Enter the IP Address that you want to be denied in *Loal IP Address* field.
4. From the *Protocol* drop-down list, select *Both* setting.
5. Enter any comment in *Comment* field.
6. Click *Apply Changes*.



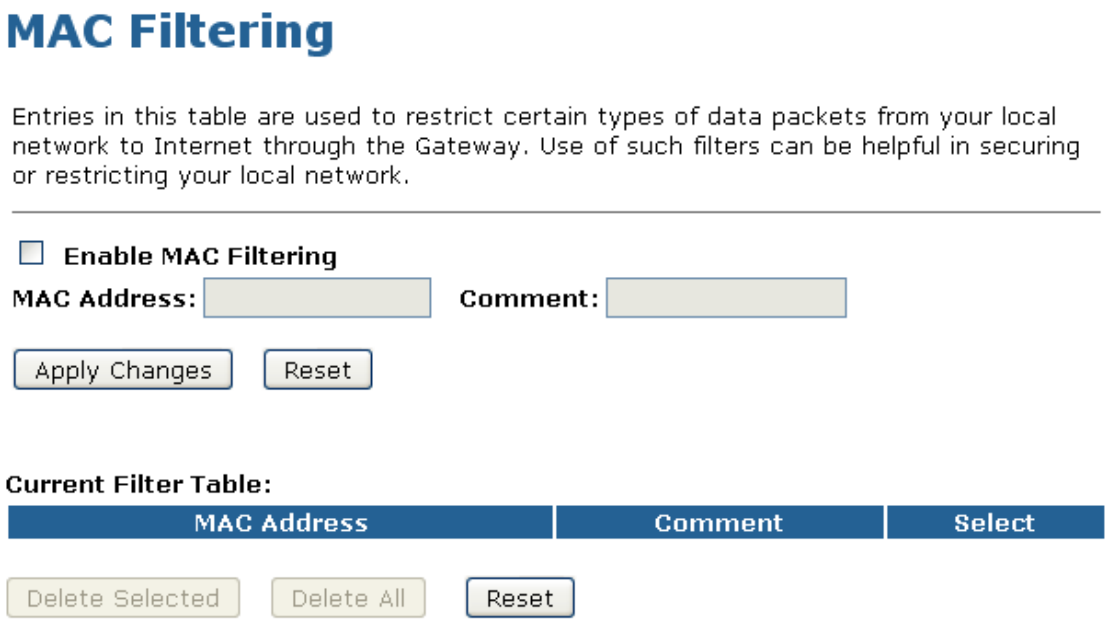
7. Now the IP Filter that you created has been added and listed in the *Current Filter Table*.
8. Now the TCP and UDP protocol for both Outbound and Inbound packet has been denied.



15. MAC Filtering

Entries in this table are used to restrict certain types of data packets from your local network to Internet through the Wireless Gateway. Use of such filters can be helpful in securing or restricting your local network.

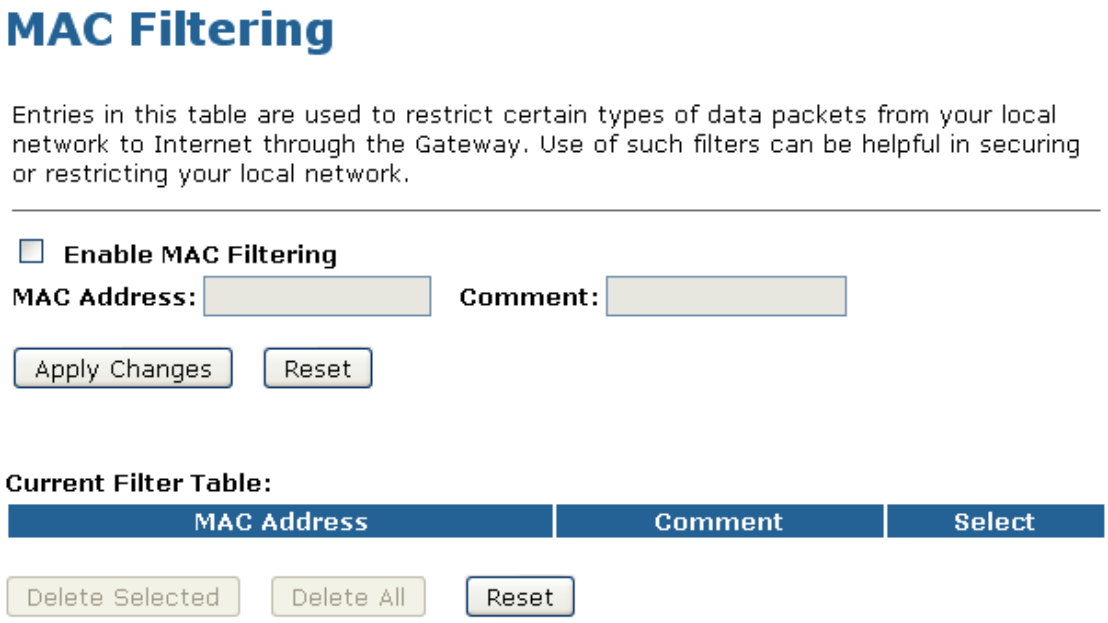
1. From the left-hand *Firewall -> MAC Filtering* menu. The following page is displayed:



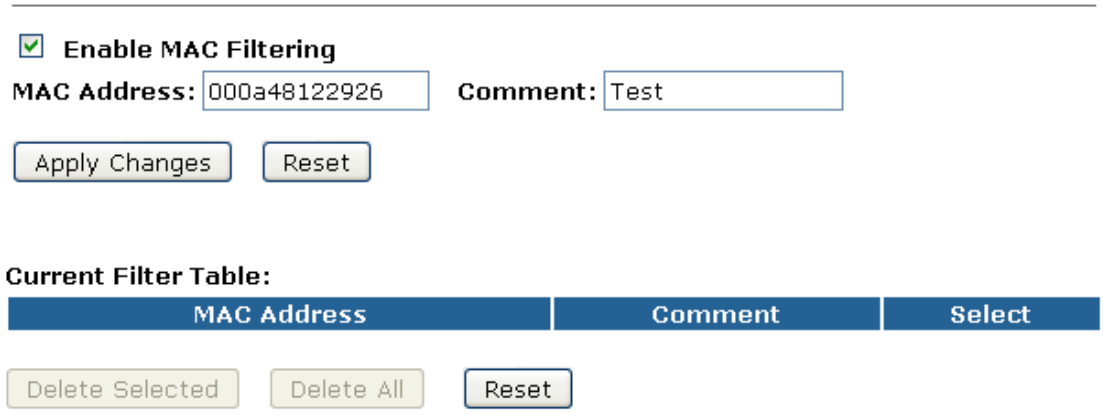
15.1 MAC filtering for specified MAC Address

Please follow example below to deny the specified MAC Address has the Internet Access.

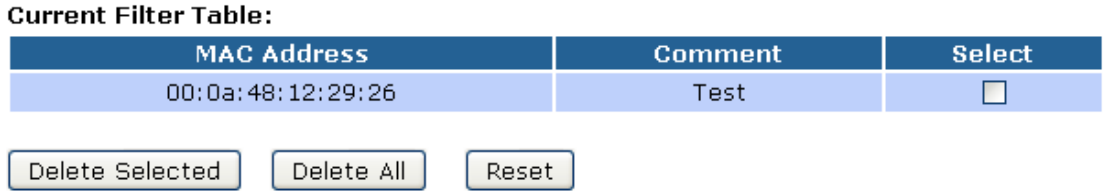
1. From the left-hand *Firewall -> MAC Filtering* menu. The following page is displayed:



2. Check the option *Enable MAC Filtering* to enable the MAC Filtering.
3. Enter the MAC Address that you want to be denied in *MAC Address* field.
4. Enter any comment in *Comment* field.
5. Click *Apply Changes*.



6. Now the MAC Filter that you created has been added and listed in the *Current Filter Table*.
7. Now the MAC Address in the *Current Filter Table* cannot have the Internet Access.



16. Port Forwarding

Entries in this table allow you to automatically redirect common network services to a specific machine behind the NAT firewall. These settings are only necessary if you wish to host some sort of server like a web server or mail server on the private local network behind your Gateway's NAT firewall.

Your device has built in advanced Security features that protect your network by blocking unwanted traffic from the Internet.

If you simply want to connect from your local network to the Internet, you do not need to make any changes to the default Security configuration. You only need to edit the configuration if you wish to do one or both of the following:

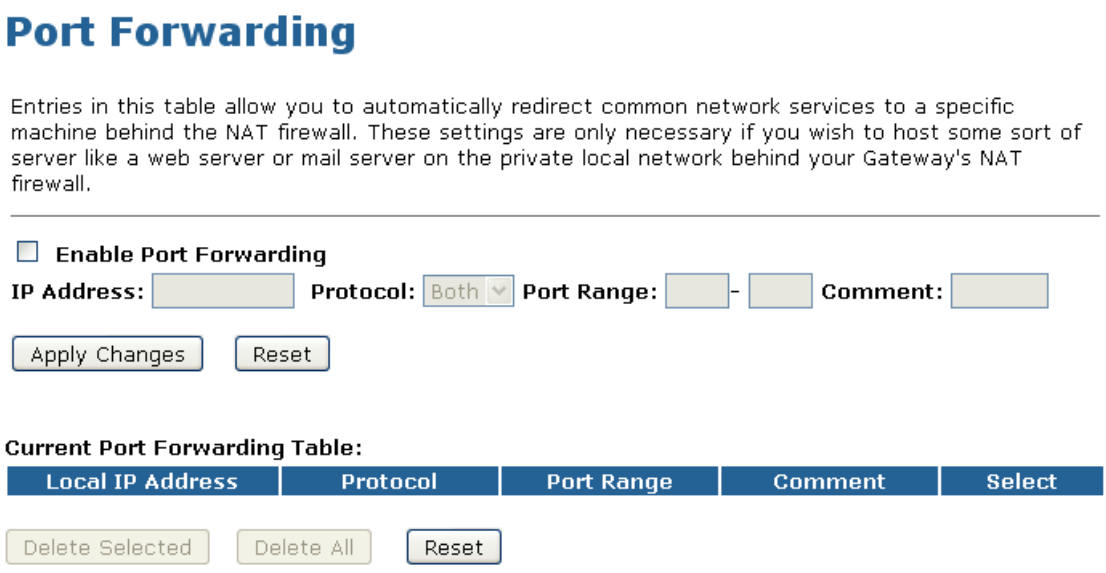
- allow Internet users to browse the user pages on your local network (for example, by providing an FTP or HTTP server)
- play certain games which require accessibility from the Internet

This chapter describes how to configure Security to suit the needs of your network.

By default, the IP addresses of your LAN PCs are hidden from the Internet. All data sent from your LAN PCs to a PC on the Internet appears to come from the IP address of your device.

In this way, details about your LAN PCs remain private. This security feature is called *Port Forwarding*.

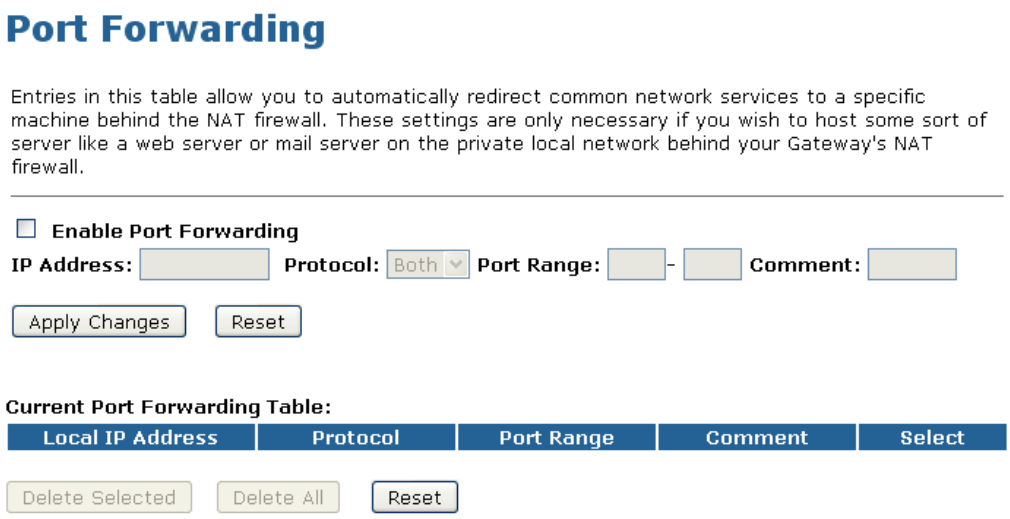
1. From the left-hand *Firewall -> Port Forwarding* menu. The following page is displayed:



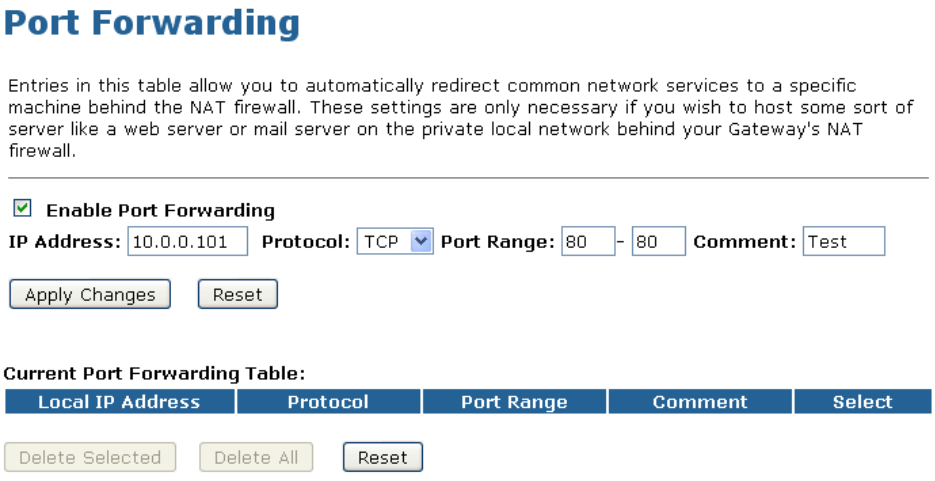
16.1 Port Forwarding for TCP with specified IP

Please follow example below to configure the Port Forwarding to Specified IP with TCP.

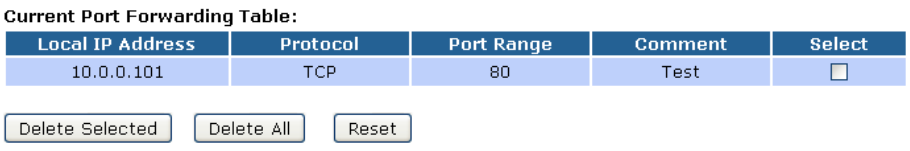
1. From the left-hand *Firewall -> Port Forwarding* menu. The following page is displayed:



2. Check the option *Enable Port Forwarding* to enable the Enable Port Forwarding.
3. Enter the IP Address that the port you want to be forwarded in *IP Address* field.
4. From the *Protocol* drop-down list, select *TCP* setting.
5. Enter any comment in *Comment* field.
6. Click *Apply Changes*.



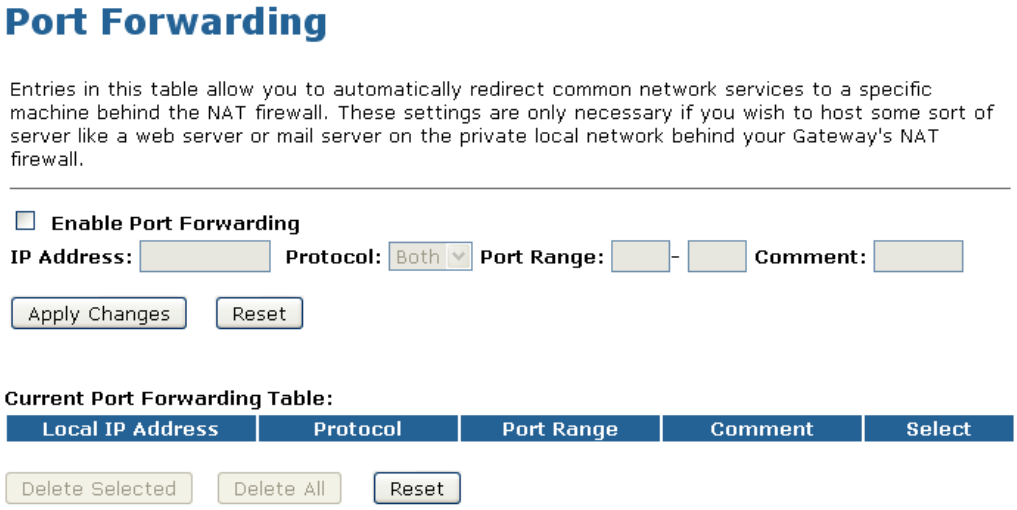
7. Now the IP Address and port range that you created has been added and listed in the *Current Filter Table*.
8. Now the port range of the IP Address in the *Current Filter Table* can be access from Internet by TCP protocol.



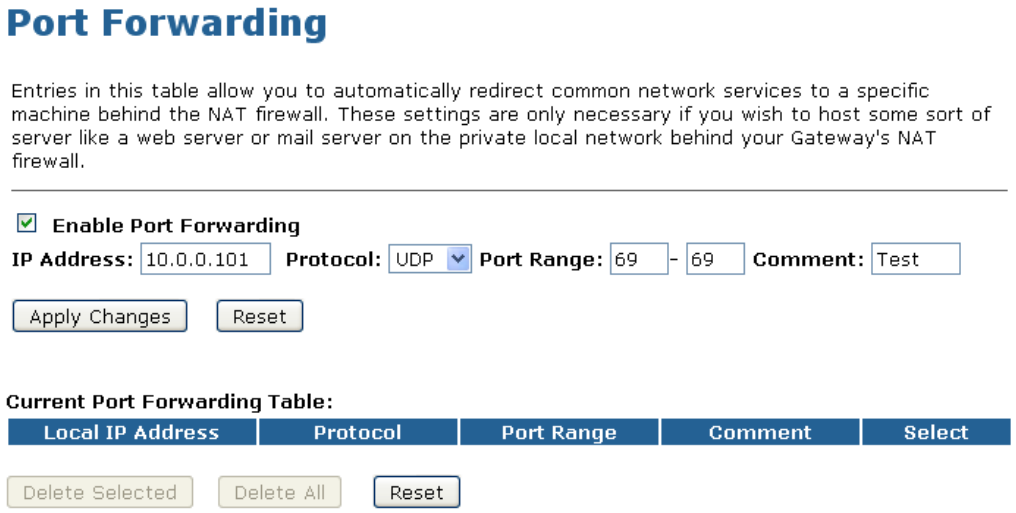
16.2 Port Forwarding for UDP with specified IP

Please follow example below to configure the Port Forwarding to Specified IP with UDP.

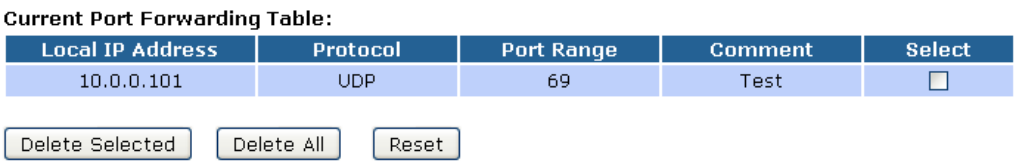
1. From the left-hand *Firewall -> Port Forwarding* menu. The following page is displayed:



2. Check the option *Enable Port Forwarding* to enable the Enable Port Forwarding.
3. Enter the IP Address that the port you want to be forwarded in *IP Address* field.
4. From the *Protocol* drop-down list, select *UDP* setting.
5. Enter any comment in *Comment* field.
6. Click *Apply Changes*.



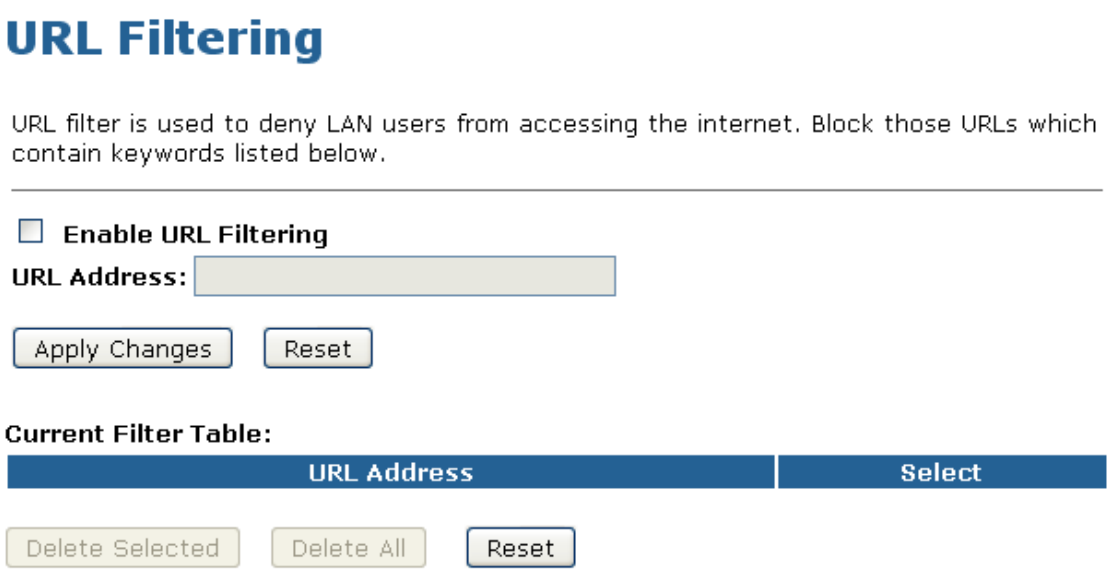
7. Now the IP Address and port range that you created has been added and listed in the *Current Filter Table*.
8. Now the port range of the IP Address in the *Current Filter Table* can be access from Internet by UDP protocol.



17. URL Filtering

URL filter is used to deny LAN users from accessing the internet. Block those URLs which contain keywords listed below.

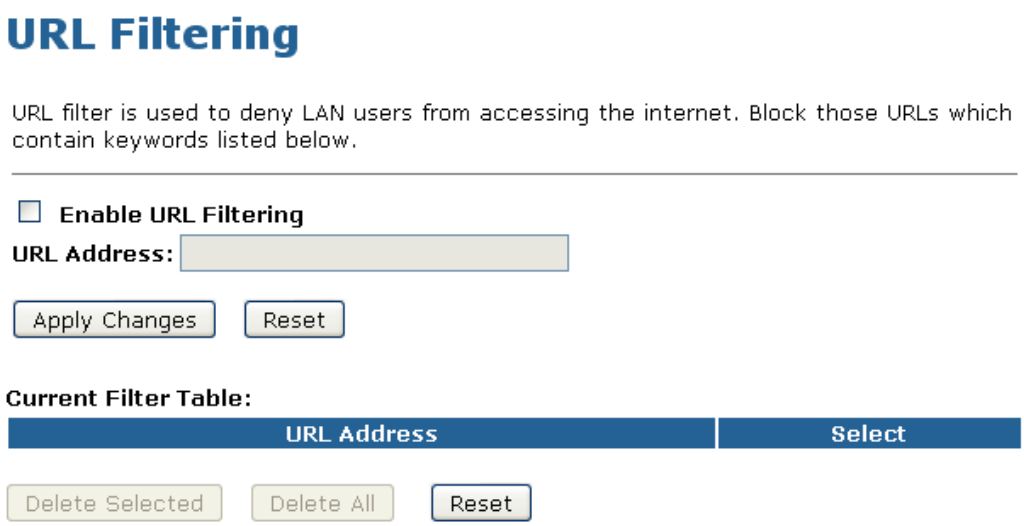
1. From the left-hand *Firewall -> URL Filtering* menu. The following page is displayed:



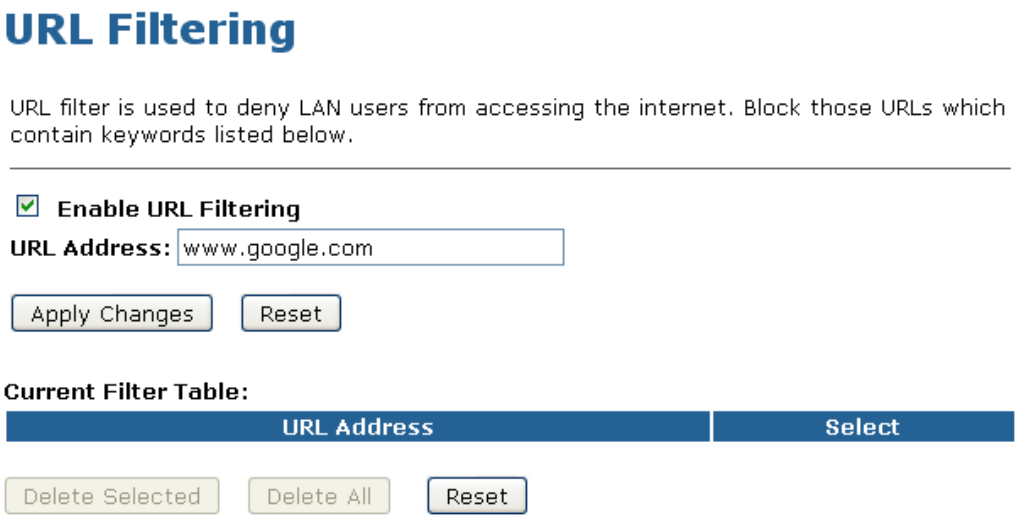
17.1 URL filtering for specified URL Address

Please follow example below to deny LAN users from accessing the Internet.

1. From the left-hand *Firewall -> URL Filtering* menu. The following page is displayed:



2. Check the option *Enable URL Filtering* to enable the URL Filtering.
3. Enter the URL Address that you want to be denied for LAN user.
4. Click *Apply Changes*.

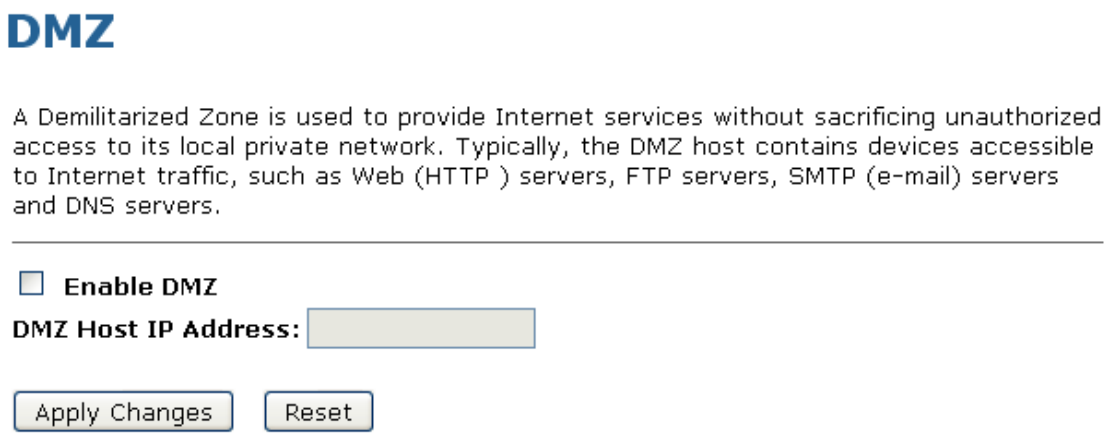


5. Now the URL Filter that you created has been added and listed in the *Current Filter Table*.
6. Now the URL Address in the *Current Filter Table* cannot be visited.

18. DMZ

A Demilitarized Zone is used to provide Internet services without sacrificing unauthorized access to its local private network. Typically, the DMZ host contains devices accessible to Internet traffic, such as Web (HTTP) servers, FTP servers, SMTP (e-mail) servers and DNS servers.

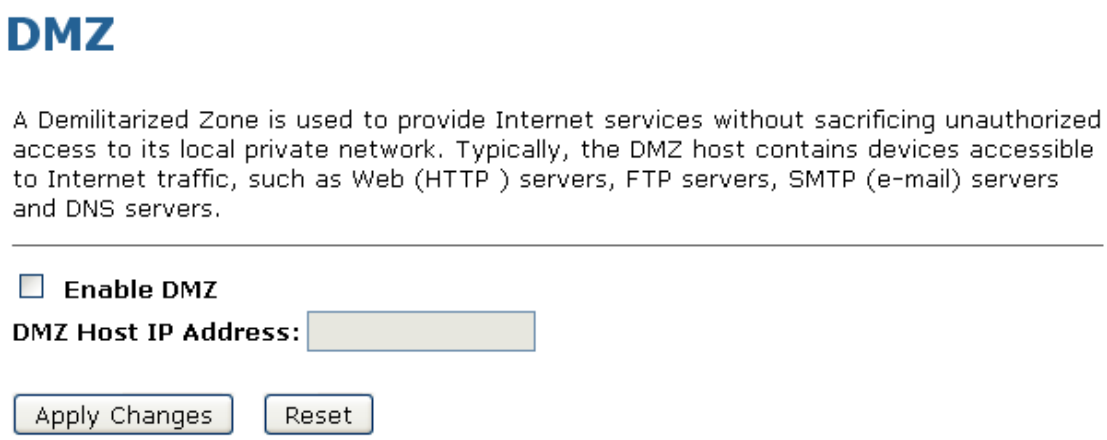
1. From the left-hand *Firewall -> DMZ* menu. The following page is displayed:



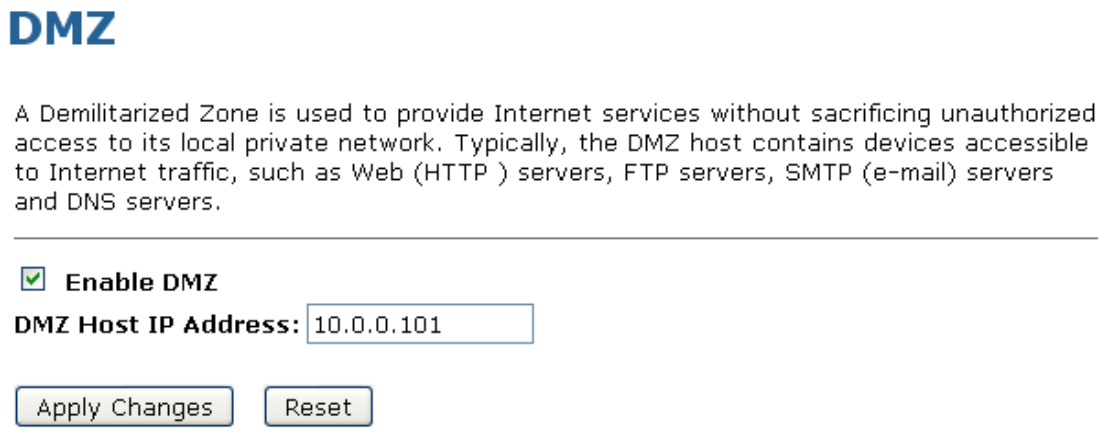
18.1 DMZ Host IP Address

Please follow example below to configure the DMZ to Host IP Address.

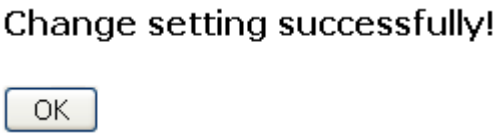
1. From the left-hand *Firewall -> DMZ* menu. The following page is displayed:



2. Check the option *Enable DMZ* to enable the Enable DMZ.
3. Enter the IP Address that to be the DMZ Host in *DMZ Host IP Address* field.
4. Click *Apply Changes*.



5. Click *OK*.



19. VLAN

Entries in below table are used to config VLAN settings. VLANs are created to provide the segmentation services traditionally provided by routers. VLANs address issues such as scalability, security, and network management.

1. From the left-hand *Firewall -> VLAN* menu. The following page is displayed:

VLAN Settings

Entries in below table are used to config vlan settings. VLANs are created to provide the segmentation services traditionally provided by routers. VLANs address issues such as scalability, security, and network management.

☐ **Enable VLAN**

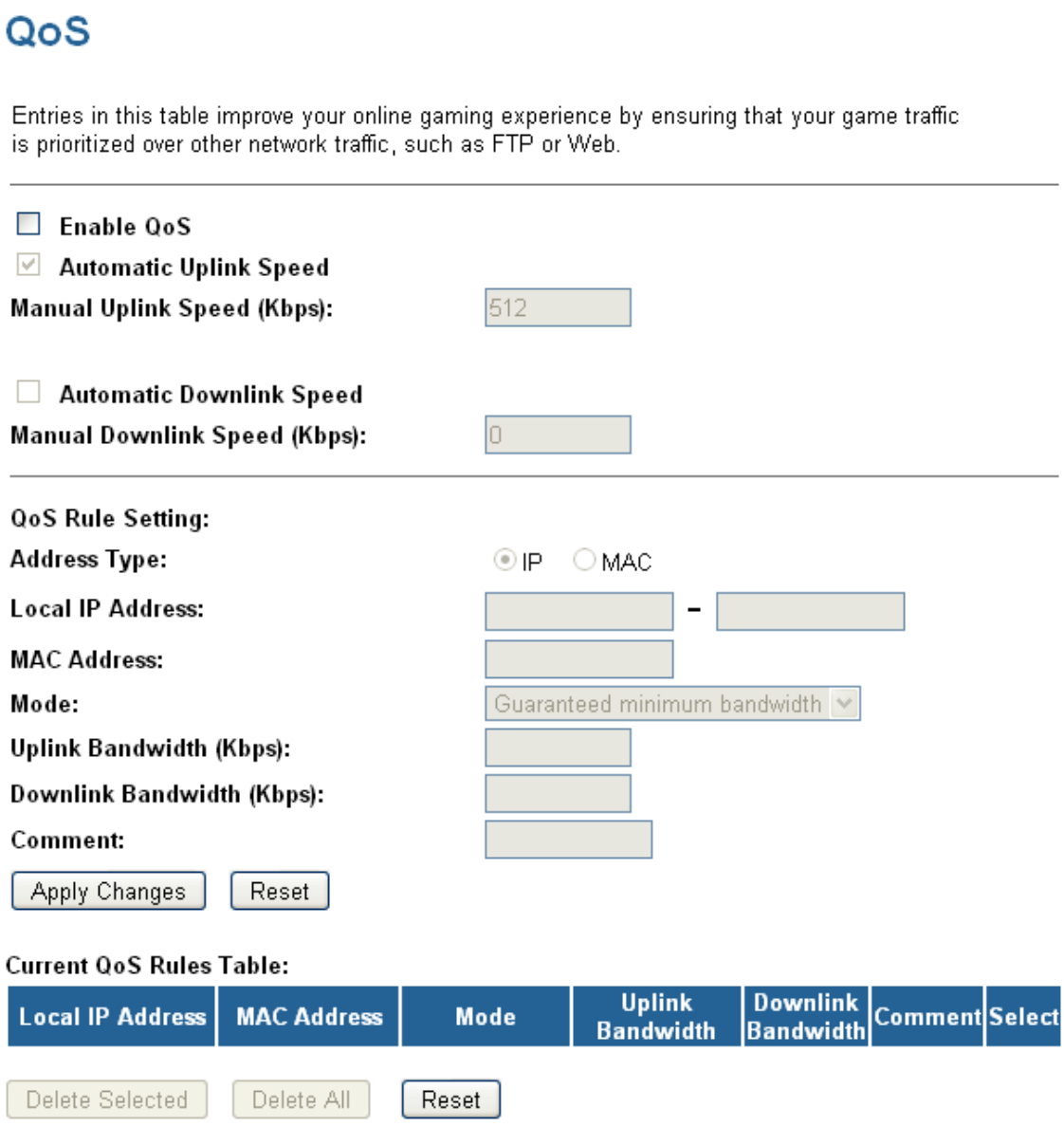
Enable	Ethernet/Wireless	WAN/LAN	Tag	VID (1~4090)	Priority	CFI
☐	Ethernet Port1	LAN	☐	3022	7	☑
☐	Ethernet Port2	LAN	☐	3030	0	☑
☐	Ethernet Port3	LAN	☐	500	3	☑
☐	Ethernet Port4	LAN	☐	1	0	☑
☐	Wireless Primary AP	LAN	☐	1	0	☑
☐	Virtual AP1	LAN	☐	1	0	☑
☐	Virtual AP2	LAN	☐	1	0	☑
☐	Virtual AP3	LAN	☐	1	0	☑
☐	Virtual AP4	LAN	☐	1	0	☑
☐	Ethernet Port5	WAN	☐	1	0	☑

Apply Changes Reset

20. QoS

Entries in this table improve your online gaming experience by ensuring that your game traffic is prioritized over other network traffic, such as FTP or Web.

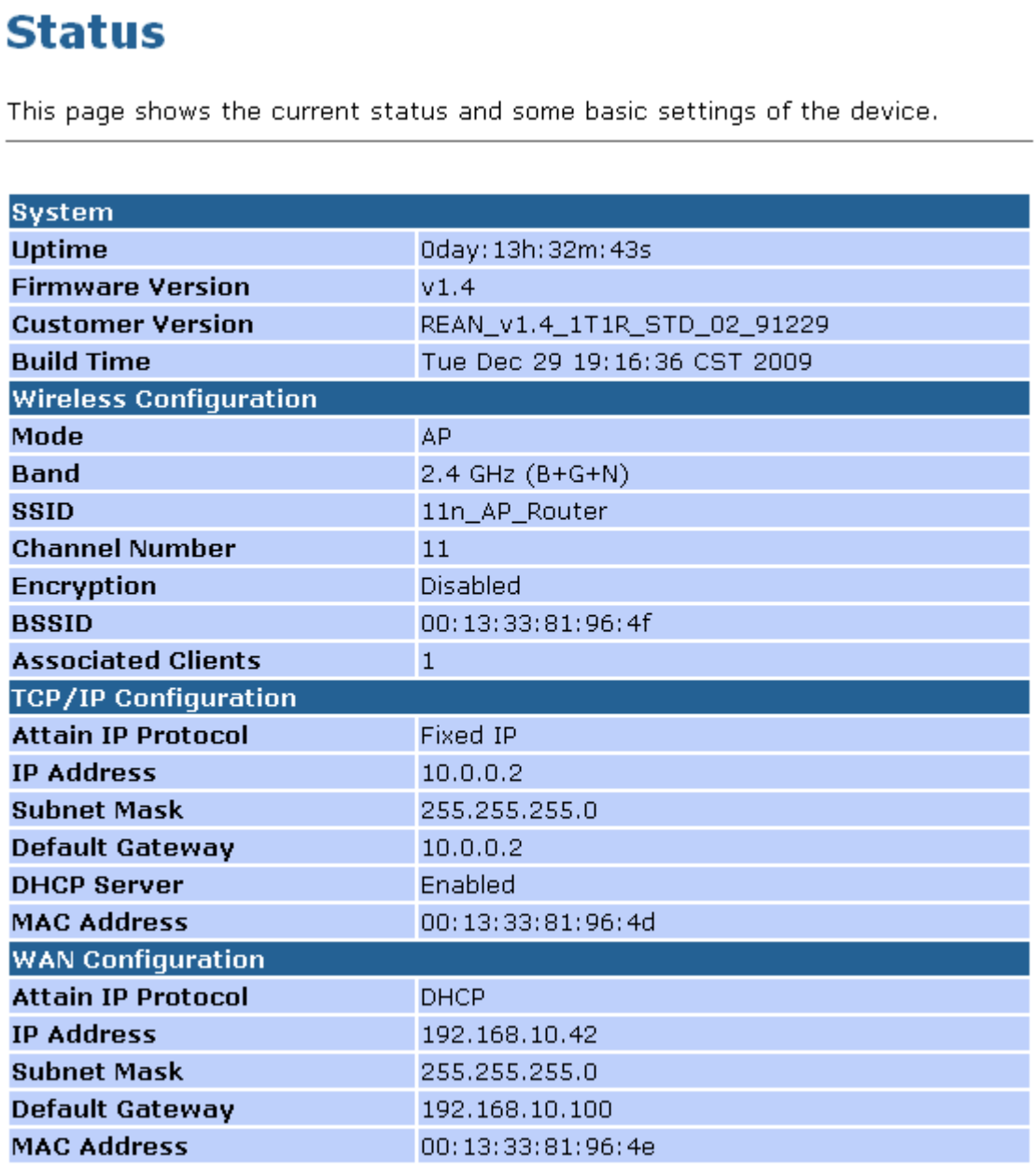
1. From the left-hand *Firewall -> QoS* menu. The following page is displayed:



21. Status

This page displays the current information for the device. It will display the LAN, WAN, and system firmware information. This page will display different information, according to WAN setting (Static IP, DHCP, or PPPoE).

1. From the left-hand *Management -> Status* menu. The following page is displayed:



Status

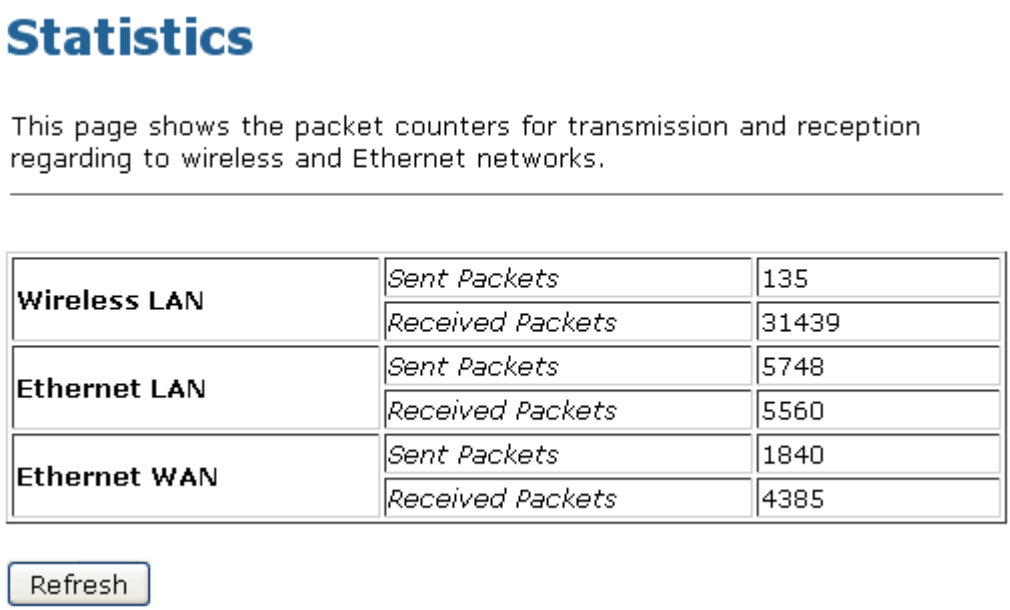
This page shows the current status and some basic settings of the device.

System	
Uptime	0day:13h:32m:43s
Firmware Version	v1.4
Customer Version	REAN_v1.4_1T1R_STD_02_91229
Build Time	Tue Dec 29 19:16:36 CST 2009
Wireless Configuration	
Mode	AP
Band	2.4 GHz (B+G+N)
SSID	11n_AP_Router
Channel Number	11
Encryption	Disabled
BSSID	00:13:33:81:96:4f
Associated Clients	1
TCP/IP Configuration	
Attain IP Protocol	Fixed IP
IP Address	10.0.0.2
Subnet Mask	255.255.255.0
Default Gateway	10.0.0.2
DHCP Server	Enabled
MAC Address	00:13:33:81:96:4d
WAN Configuration	
Attain IP Protocol	DHCP
IP Address	192.168.10.42
Subnet Mask	255.255.255.0
Default Gateway	192.168.10.100
MAC Address	00:13:33:81:96:4e

22. Statistics

This page shows the packet counters for transmission and reception regarding to wireless and Ethernet networks.

1. From the left-hand *Management -> Statistics* menu. The following page is displayed:



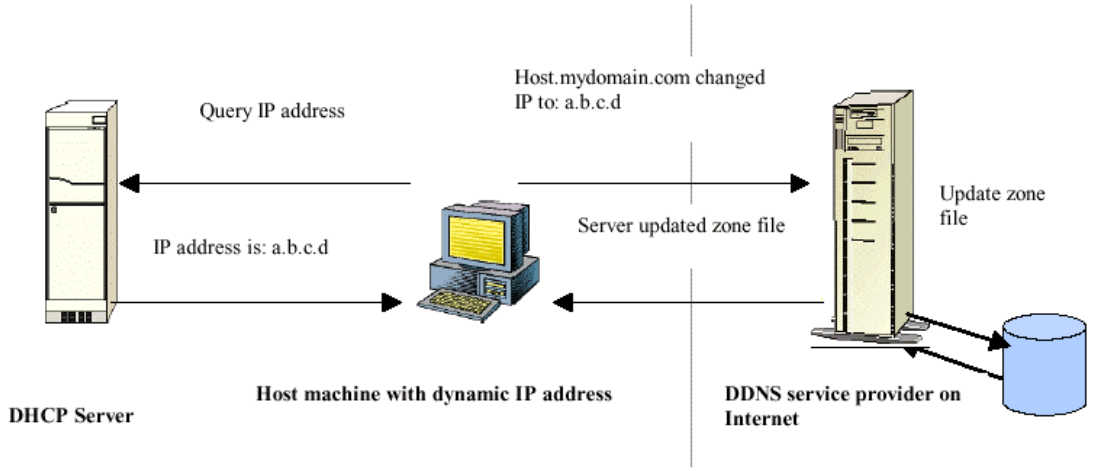
23. Dynamic DNS

When you want your internal server to be accessed by using DNS name rather than using the dynamic IP address, you can use the DDNS service. The DDNS server allows to alias a dynamic IP address to a static hostname.

This chapter provides you an overview of the Dynamic DNS feature of the modem and configuration details related to it.

Overview

If some host has a dynamic IP address that keeps changing frequently, it is difficult to keep updating the IP record that is associated with the domain name of this host in the zone files. This will result in non-accessibility of this host on the Internet. Dynamic DNS service allows to keep mapping of a dynamic IP address of such host to a static hostname. Dynamic DNS services are provided by many websites. The host needs to register with some website and get a domain name. When the IP address of the host changes, it just needs to send a message to the website that's providing dynamic DNS service to this host. For this to work, an automated update client needs to be implemented. These update clients send update messages to the servers whenever there is some change in the IP address of that host. Then, the server updates the entries for that host and replies back with some return code.



Above Figure explains one such scenario in which a host gets a dynamic IP address for itself from a DHCP server. As the host has registered with one of the dynamic DNS service providers on the Internet, it sends an update message to the service provider with host name and changed IP address. The service provider updates the new IP address of the host in the zone files that have entry for that host name and replies back with some return code. The return code communicates the success or failure of the update message. This process is repeated every time the host's IP address changes.

If the dynamic DNS service provider is notified of the same IP address again and again, then it considers it an abuse and might block the host name. To avoid this scenario, the IP address that was successfully updated to the ISP is stored on the unit. Whenever we receive an IP address change notification, the new IP address is compared with the IP address that was stored on the last update. If they differ, then only an update request is sent. However, when the system comes up there is no way of knowing what was the IP address on last successful update before the system went down. You need to give the command “system config save“ periodically to save this IP address on Flash.

Registering With Dynamic DNS Service Provider

Currently, Wireless Gateway supports two Dynamic DNS service providers, www.tzo.com and www.dyndns.com. To use their Dynamic DNS service, you first need to visit the Web site of a service provider and register. While registering, you need to provide your username, password, and hostname as mandatory parameters. A service provider may also prompt you to fill some optional parameters.

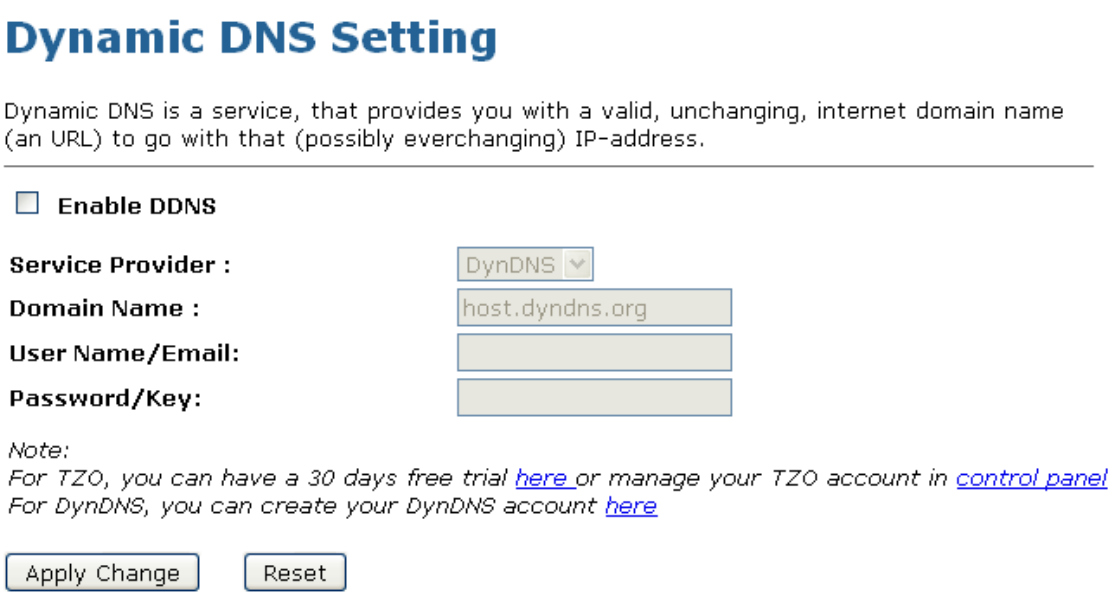
Configuring IP Interfaces

You need to create a Dynamic DNS interface per IP interface and can only create one Dynamic DNS interface service on one IP interface. For more information on creating IP interfaces,refer to section Creating IP interfaces.

***Note**: www.dyndns.org provides three kinds of services - Dynamic DNS, Custom DNS and Static DNS. You can create different domains in these systems. Custom DNS service is a full DNS solution for newly purchased domains or domains you already own. A web-based interface provides complete control over resource records and your entire domain, including support for dynamic IPs and automated updates. Static DNS service points a DNS hostname in some domain owned by dyndns.org to the user's ISP-assigned static or pseudo-static IP address.*

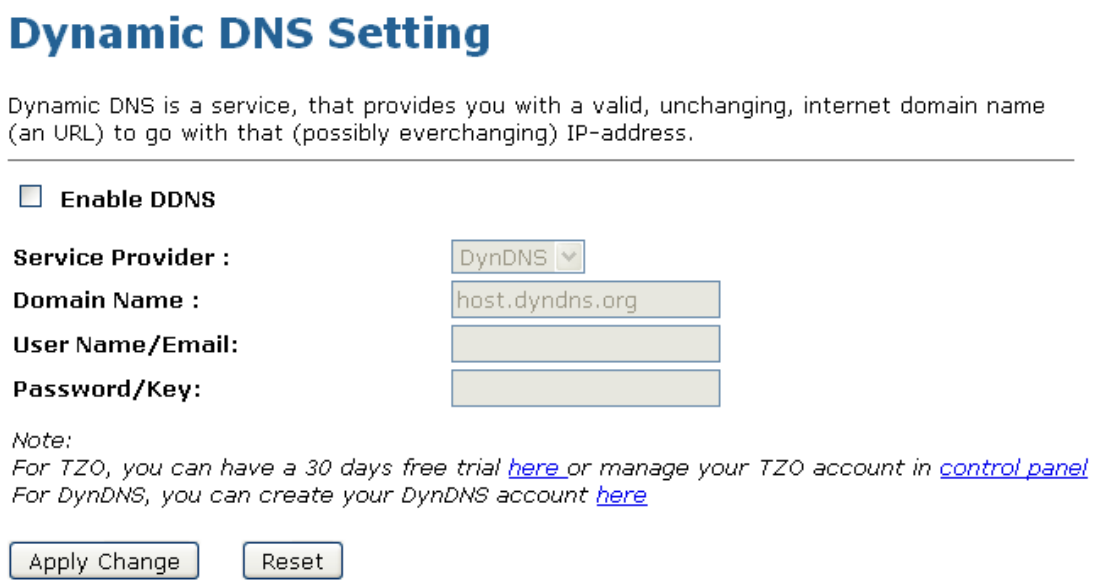
DynDNS service points a fixed hostname in some domain owned by dyndns.org to the user's ISP-assigned dynamic IP address. This allows more frequent update of IP addresses, than allowed by Static DNS

1. From the left-hand *Management -> DDNS* menu. The following page is displayed:

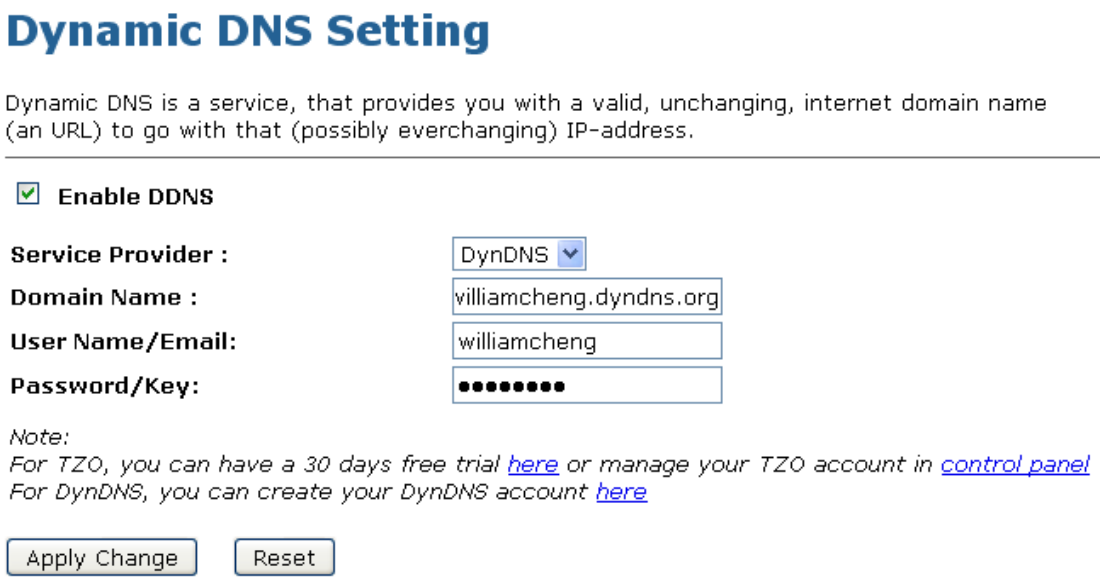


23.1 Configure DynDNS

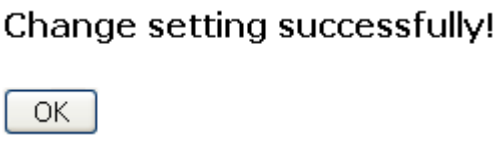
1. From the left-hand *Management -> DDNS* menu. The following page is displayed:



2. Click on *Enable DDNS*
3. Select the DynDNS from the *Service Provider* drop-down list.
4. Type your own unique *User Name*, *Password* and *Domain Name* which you applied from www.dyndns.com in the relevant boxes. They can be any combination of letters or numbers with a maximum of 20 characters.
5. Click *Apply Changes*.

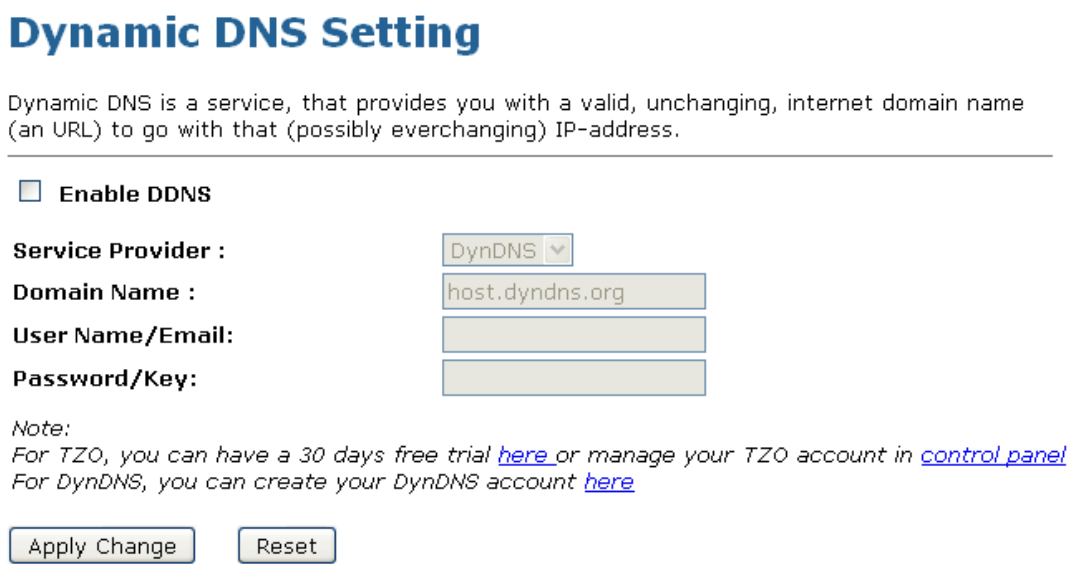


6. Click *OK*.

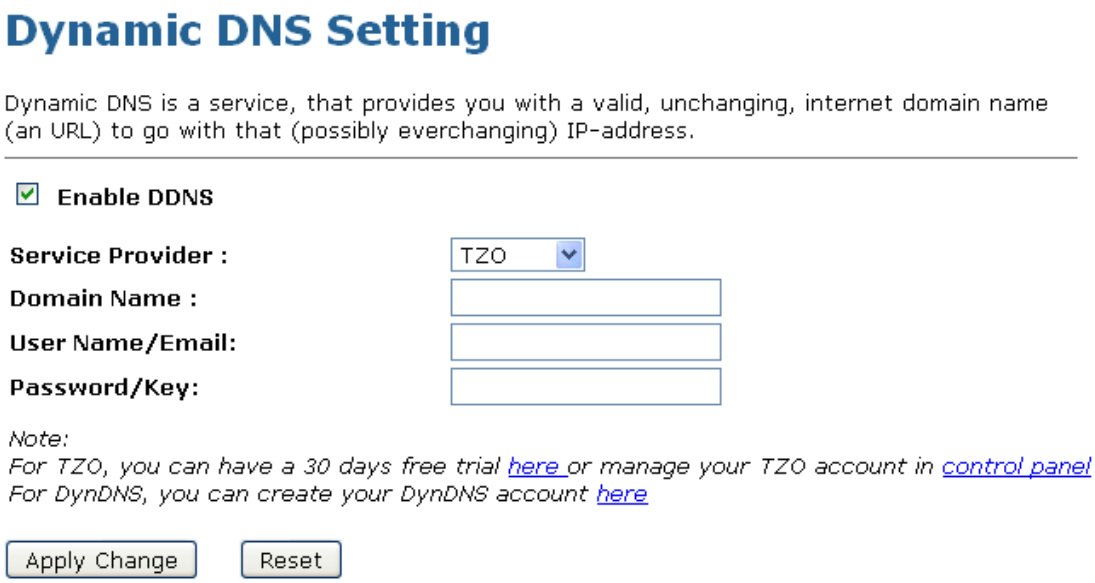


23.2 Configure TZO

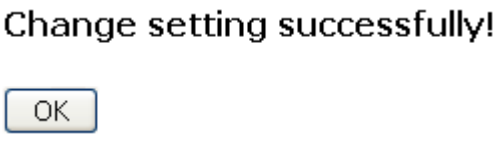
1. From the left-hand *Management -> DDNS* menu. The following page is displayed:



2. Click on *Enable DDNS*
3. Select the TZO from the *Service Provider* drop-down list.
4. Type your own unique *Email*, *Key* and *Domain Name* which you applied from http://www.tzo.com/MainPageWebClient/clientsignup.html in the relevant boxes. They can be any combination of letters or numbers with a maximum of 20 characters.
5. Click *Apply Changes*.



6. Click *OK*.

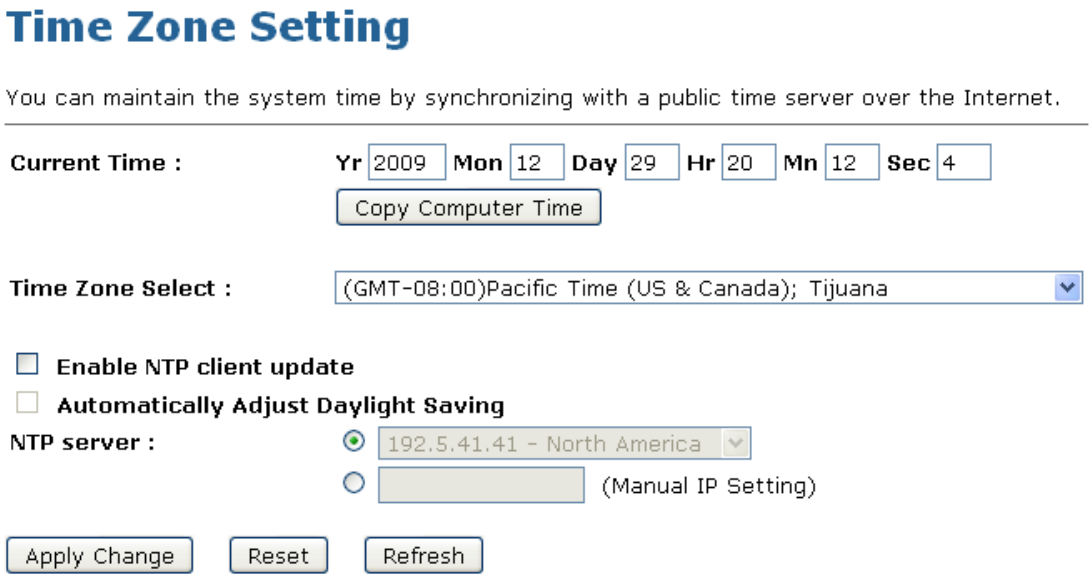


24. Time Zone Setting

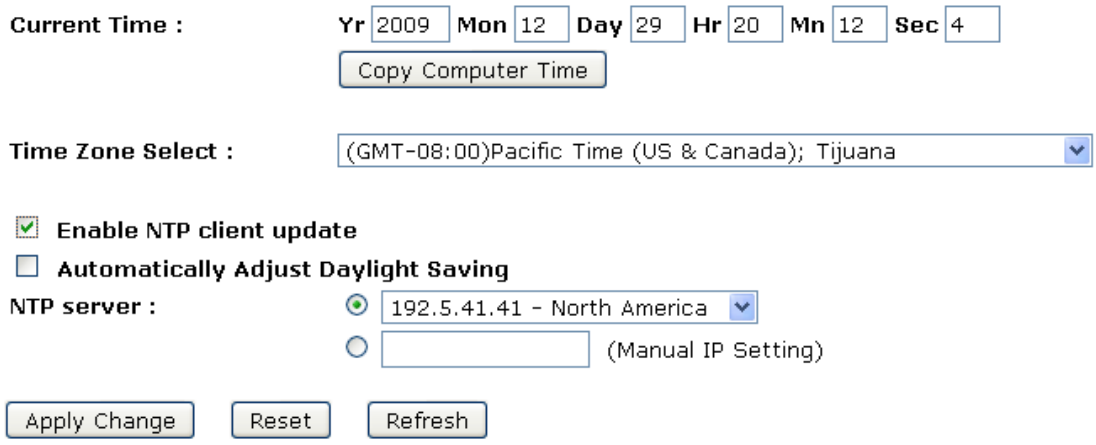
Certain systems may not have a date or time mechanism or may be using inaccurate time/day information. the Simple Network Time Protocol feature provides a way to synchronize the device's own time of day setting with a remote time server as described in RFC 2030 (SNTP) and RFC 1305 (NTP).

SNTP Server and SNTP Client Configuration settings

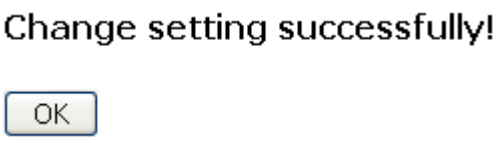
1. From the left-hand *Management* menu, click on *Time Zone Setting*. The following page is displayed:



2. From the *Time Zone Select* drop-down list, select *Your Own Time Zone*.
3. Check the option *Enable NTP client update*.
4. From the *NTP server* drop-down list, select a *NTP Server*. Or you can add server to the SNTP association list using IP address. Adding a server to the association list automatically starts the synchronization process.
5. Click *Apply Change*.



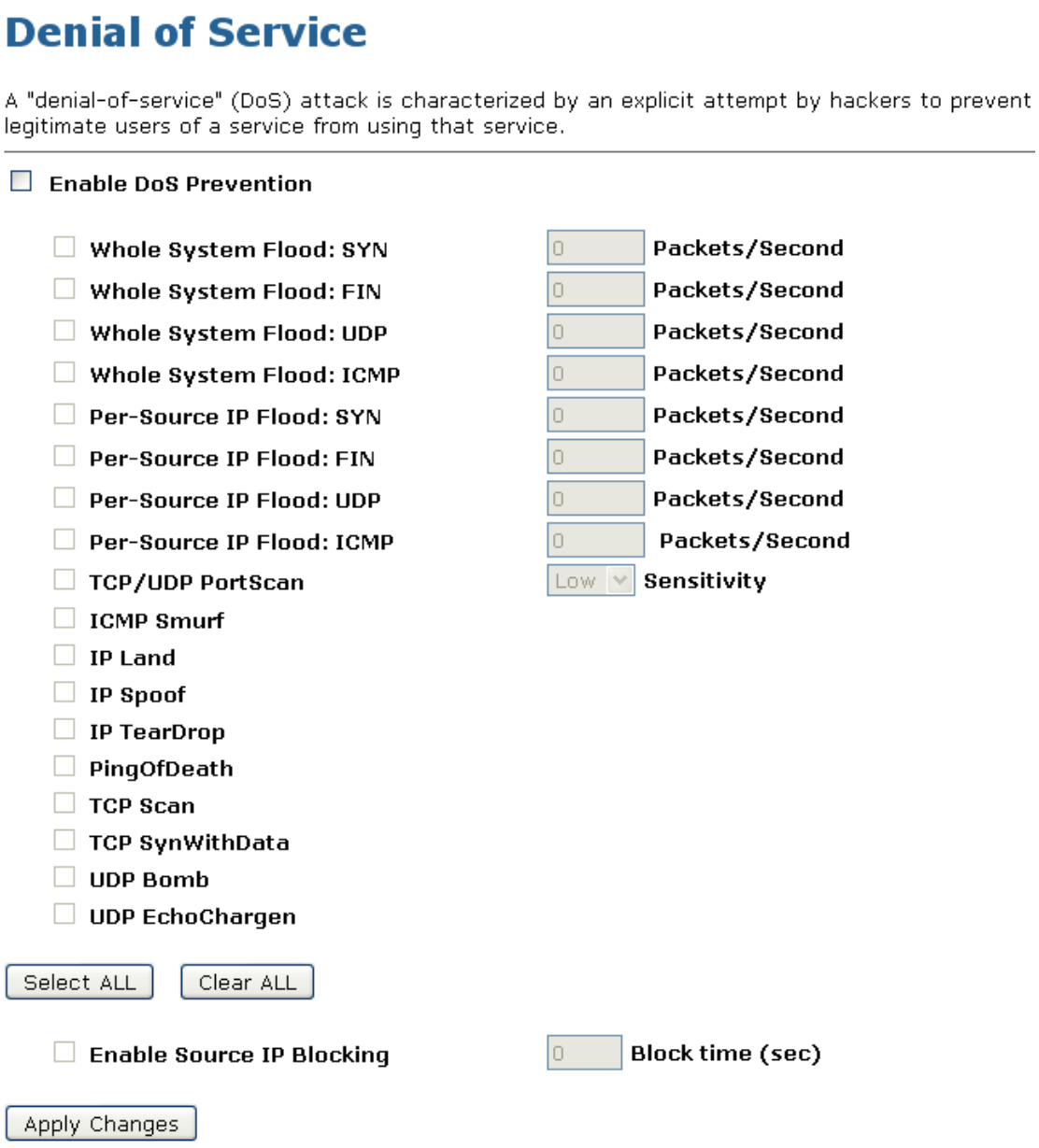
6. Click *OK*.



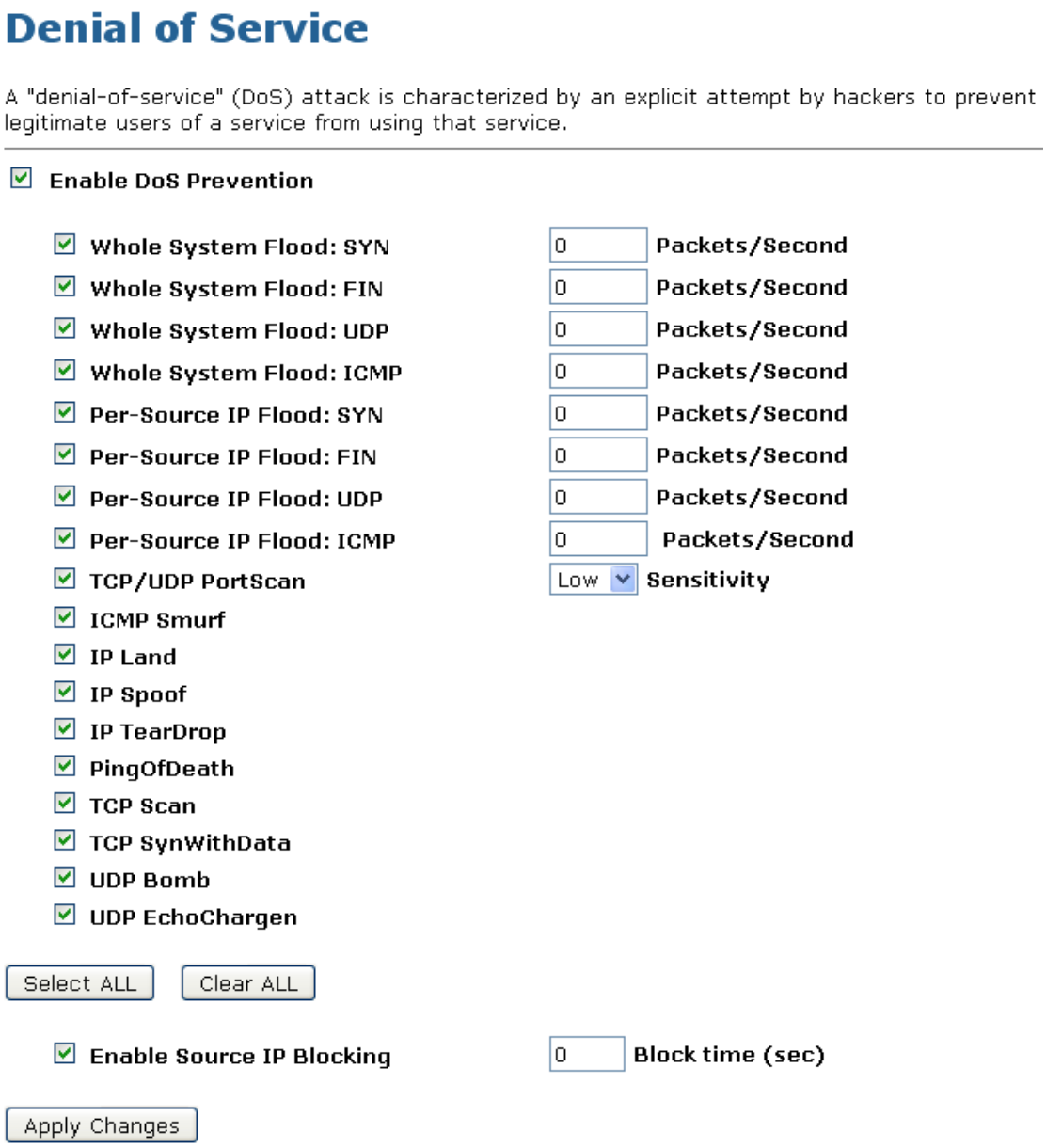
25. Denial-of-Service

A "denial-of-service" (DoS) attack is characterized by an explicit attempt by hackers to prevent legitimate users of a service from using that service.

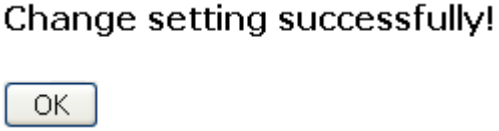
1. From the left-hand *Management* menu, click on *Denial-of-Service*. The following page is displayed:



2. Check the option *Enable NTP client update*.
3. Check the option of each *Service*.
4. Check the option *Enable Source IP Blocking*.
5. Click *Apply Changes*.



6. Click *OK*.

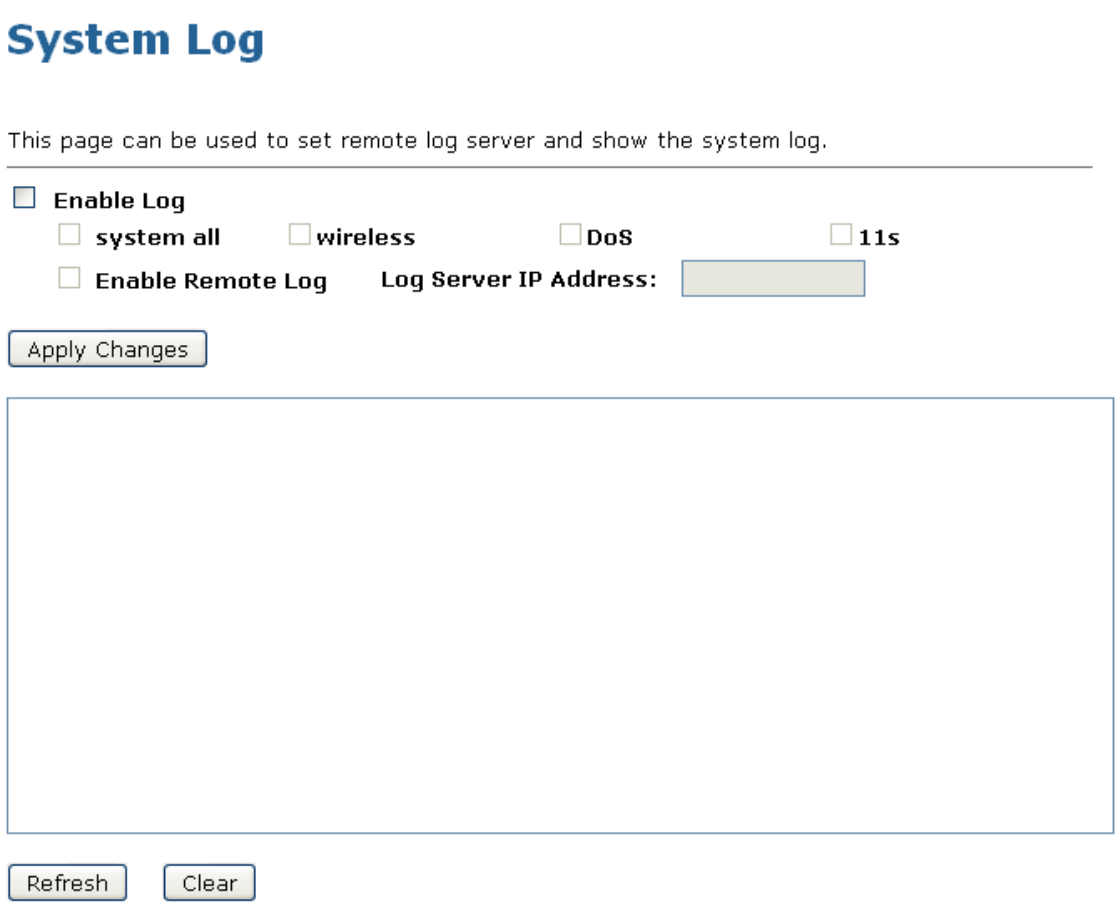


26. Log

This page can be used to set remote log server and show the system log.

System Log

1. From the left-hand *Management* menu, click on *Log*. The following page is displayed:

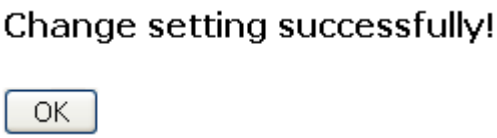


Option	Description
Enable Log	**Enable/Disable the feature.** **Default: Disable**
system all	**All system logs will be recorded in the system log**
wireless	**The wireless logs will be recorded in the system log**
DoS	**The DoS logs will be recorded in the system log**
Enable Remote Log	**Enable: Send the system log to remote log server. To do this, make sure a secure syslog server is available. Default: Disable**
Log Server IP Address	**Enter the IP Address of remote log server.**

2. Check the option *Enable Log*.
3. Check the option *system all, wireless* or *DoS*.

4. Check the option *Enable Remote Log*.
5. Enter the IP Address in the *Log Server IP Address* field.
6. Click *Apply Changes*.

7. Click *OK*.



27. Firmware Update

27.1 About firmware versions

Firmware is a software program. It is stored as read-only memory on your device. Hamletcom is continually improving this firmware by adding new features to it and these features are saved in later versions of the firmware.

Your device can check whether there are later firmware versions available. If there is a later version, you can download it via the Internet and install it on your device.

***Note**: If there is a firmware update available you are strongly advised to install it on your device to ensure that you take full advantage of any new feature developments*

27.2 Manually updating firmware

You can manually download the latest firmware version from www.hamletcom.com's website to your PC's file directory.

Once you have downloaded the latest firmware version to your PC, you can manually select and install it as follows:

1. From the left-hand *Management* menu, click on *Upgrade Firmware*. The following page is displayed:
2. Click on the *Browse…* button.

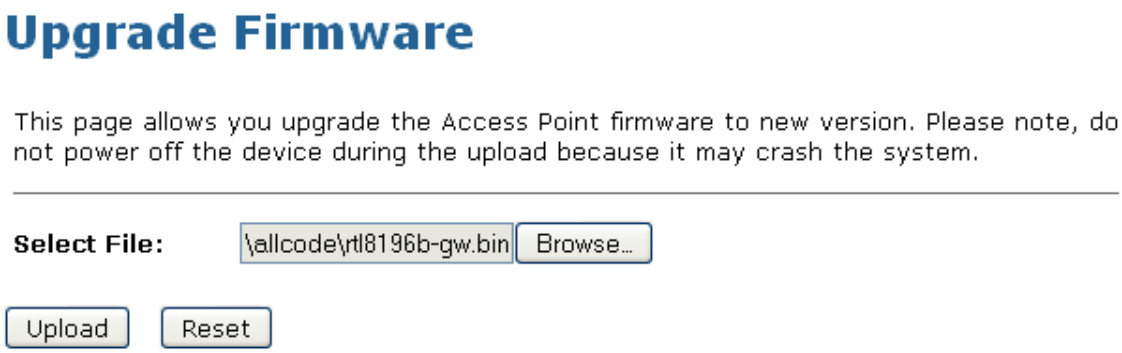


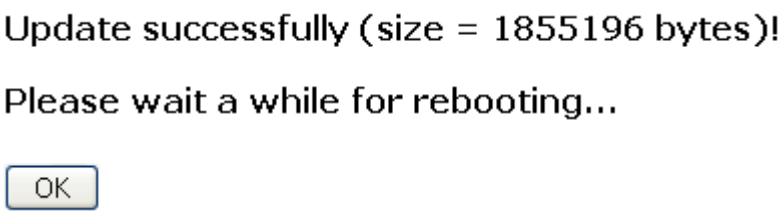
Figure 3: Manual Update Installation section

(Note that if you are using certain browsers (such as *Opera 7*) the *Browse* button is labeled *Choose*.)

Use the *Choose file* box to navigate to the relevant directory where the firmware version is saved.

3. Once you have selected the file to be installed, click *Open*. The file's directory path is displayed in the *New Firmware Image:* text box.
4. Click *Upgrade* >. The device checks that the selected file contains an updated version of firmware. A status screen pops up, please wait for a while…….

5. Firmware update has been updated completely. The following page is displayed:
6. Click *OK*.



28. Save/Reload Settings

This page allows you save current settings to a file or reload the settings from the file which was saved previously.

Besides, you could reset the current configuration to factory default.

If you do make changes to the default configuration but then wish to revert back to the original factory configuration, you can do so by resetting the device to factory defaults.

28.1 Save Settings to File

It allows you save current settings to a file.

1. From the left-hand *Management* menu, click on *Reset factory default*. The following page is displayed:

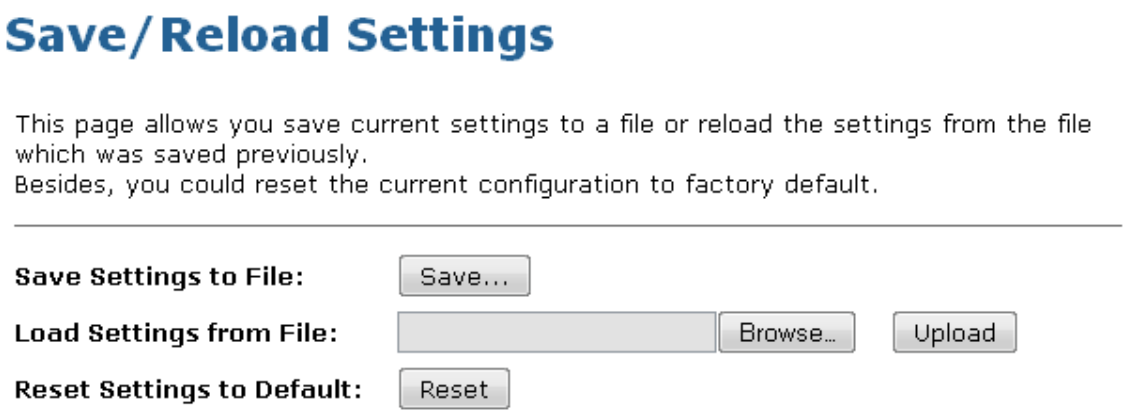
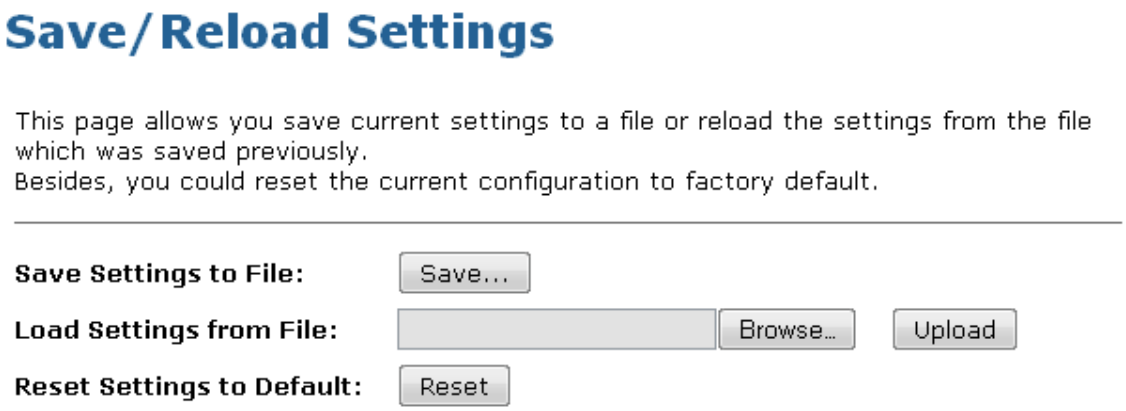


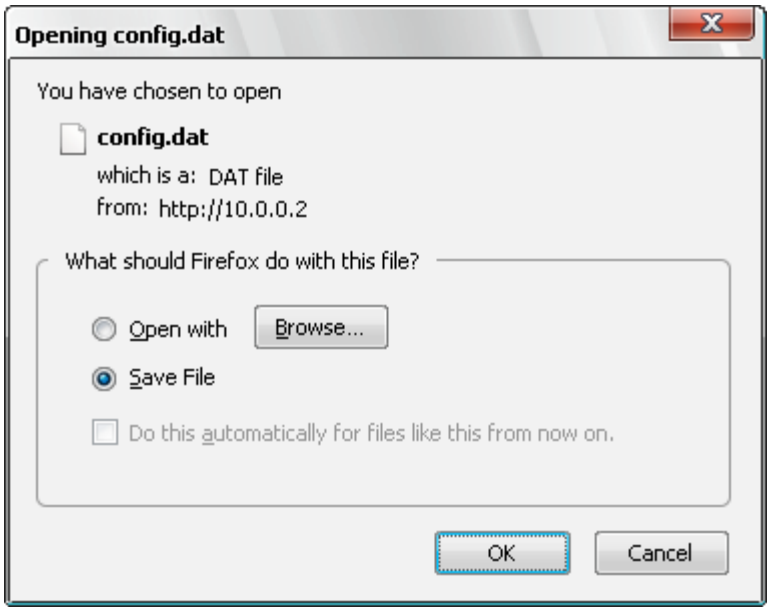
Figure 4: Reset to Defaults page

Option	Description
Save Settings to File	**Save the VoIP Settings to a File**
Load Settings from File	**Load Settings from a File**
Reset Settings to Default	**Reset VoIP Settings to Factory Default**

2. Click on *Save*….



3. If you are happy with this, click *OK* and then browse to where the file to be saved. Or click *Cancel* to cancel it.



28.2 Load Settings from File

It allows you to reload the settings from the file which was saved previously.

1. From the left-hand *Management* menu, click on *Reset factory default*. The following page is displayed:

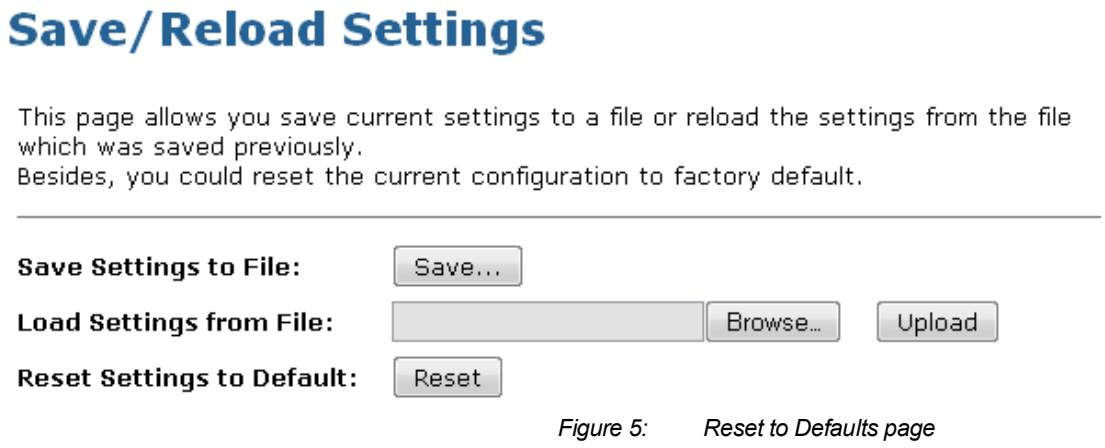
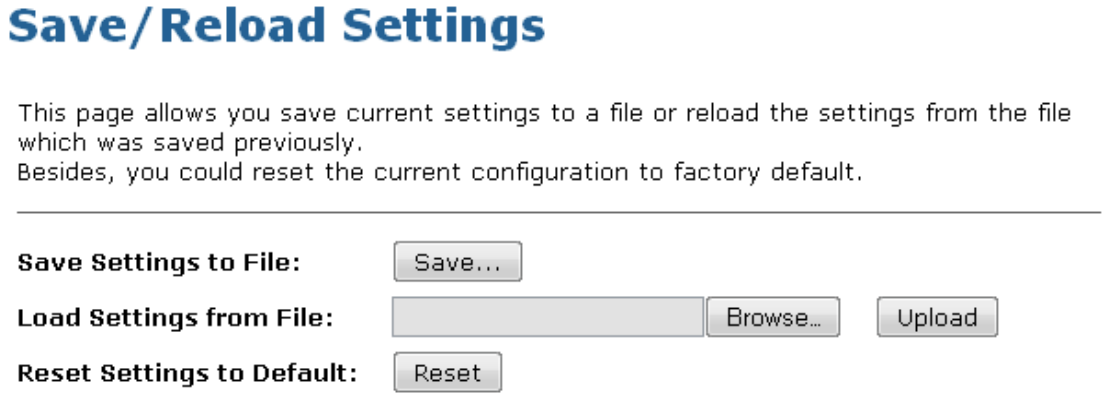
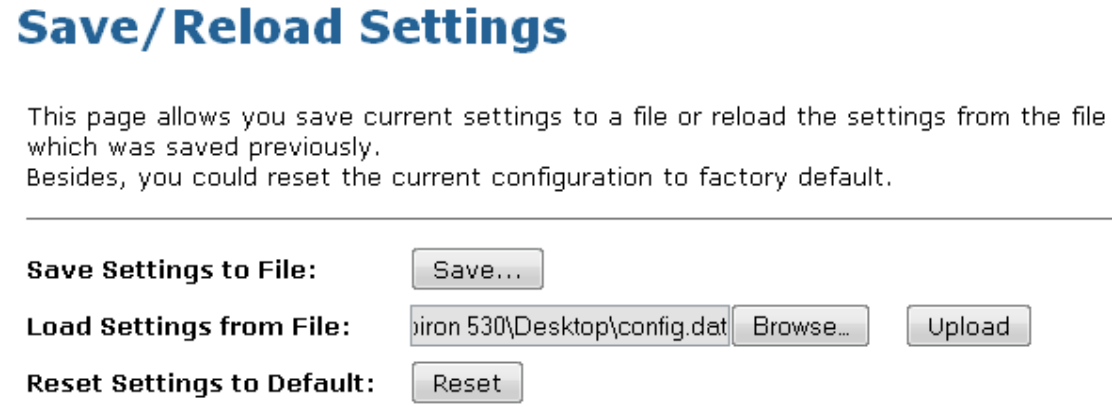


Figure 5: Reset to Defaults page

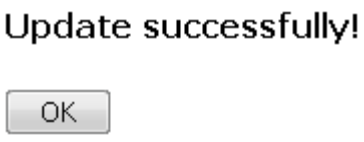
2. Click on *Browse*….to browse to where the config.dat is.



3. If you are happy with this, click *Upload* to start to load settings from file.



4. Once it finished loading settings form file, it'll show the message below.



28.3 Resetting to Defaults

If you do make changes to the default configuration but then wish to revert back to the original factory configuration, you can do so by resetting the device to factory defaults.

***Note**: If you reset your device to factory defaults, all previous configuration changes that you have made are overwritten by the factory default configuration*

Software Reset:

1. From the left-hand *Management* menu, click on *Reset factory default*. The following page is displayed:

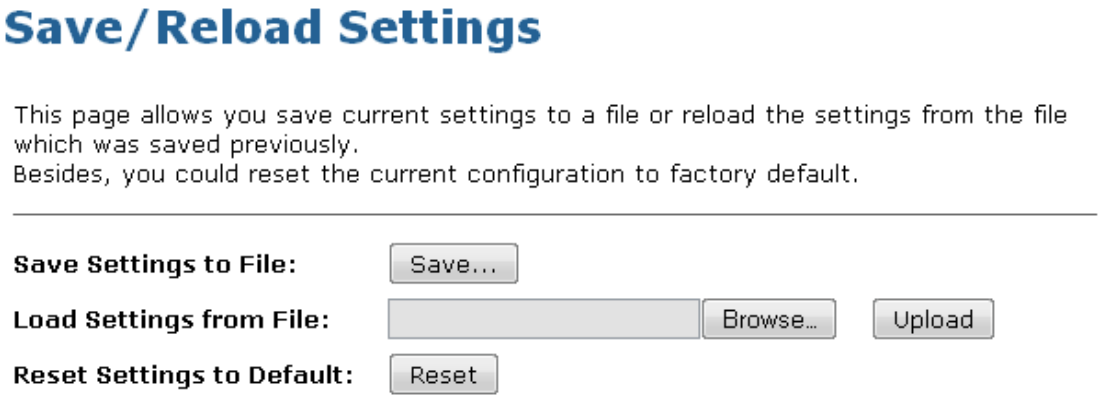
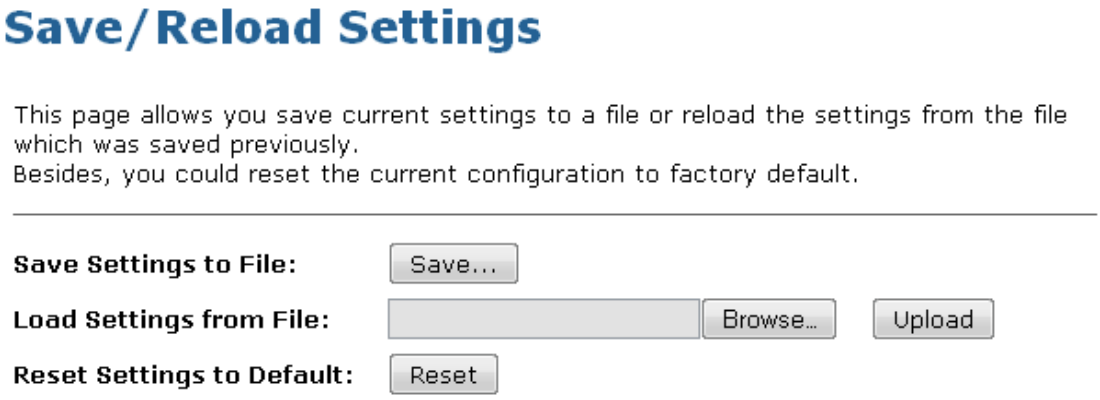
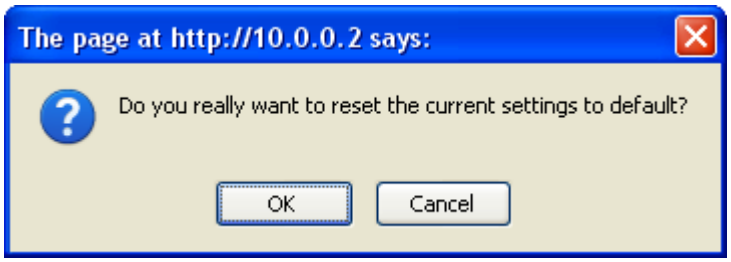


Figure 6: Reset to Defaults page

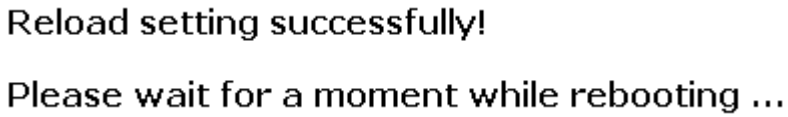
2. Click on *Reset Settings to Default*.



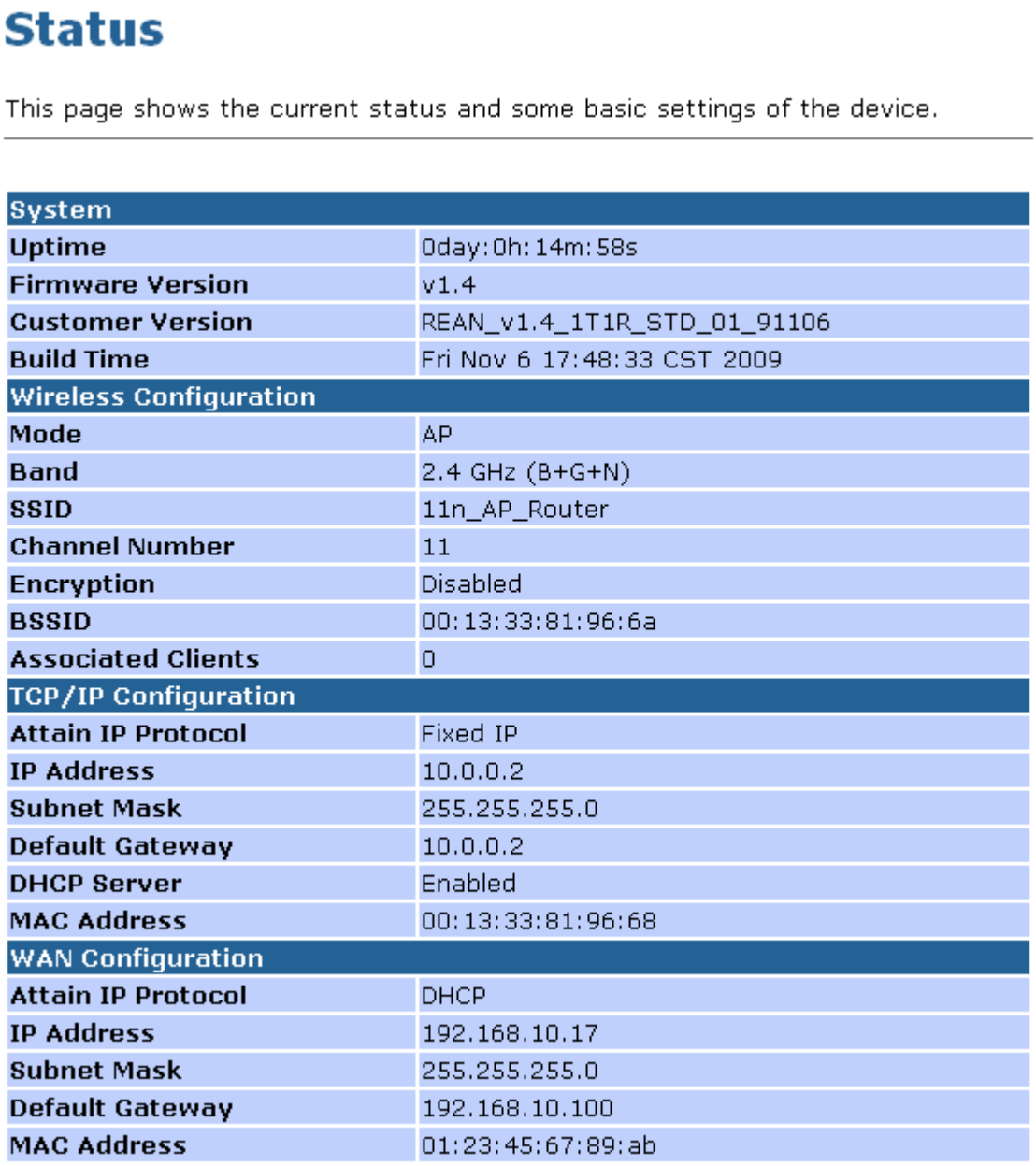
3. This page reminds you that resetting to factory defaults cannot be undone – any changes that you have made to the basic settings will be replaced. If you are happy with this, click *OK*. Or click *Cancel* to cancel it.



4. Reload setting successfully! Please wait for a moment while rebooting ...



5. Once it finished resetting to factory, it'll show the Status page.



Status

This page shows the current status and some basic settings of the device.

System	
Uptime	0day:0h:14m:58s
Firmware Version	v1.4
Customer Version	REAN_v1.4_1T1R_STD_01_91106
Build Time	Fri Nov 6 17:48:33 CST 2009
Wireless Configuration	
Mode	AP
Band	2.4 GHz (B+G+N)
SSID	11n_AP_Router
Channel Number	11
Encryption	Disabled
BSSID	00:13:33:81:96:6a
Associated Clients	0
TCP/IP Configuration	
Attain IP Protocol	Fixed IP
IP Address	10.0.0.2
Subnet Mask	255.255.255.0
Default Gateway	10.0.0.2
DHCP Server	Enabled
MAC Address	00:13:33:81:96:68
WAN Configuration	
Attain IP Protocol	DHCP
IP Address	192.168.10.17
Subnet Mask	255.255.255.0
Default Gateway	192.168.10.100
MAC Address	01:23:45:67:89:ab

29. Password

You can restrict access to your device's web pages using password protection. With password protection enabled, users must enter a username and password before gaining access to the web pages.

By default, password protection is enabled on your device, and the username and password set are as follows:

Username: **admin**

Password: **hamlet**

29.1 Setting your username and password

***Note**: Non-authorized users may try to access your system by guessing your username and password. We recommend that you change the default username and password to your own unique settings*

To change the default password:

1. From the left-hand *Management* menu, click on *Password*. The following page is displayed:

Figure 7: Currently Defined Administration Password: Setup page

2. This page displays the current username and password settings. Change your own unique password in the relevant boxes. They can be any combination of letters or numbers with a maximum of 30 characters. The default setting uses ***admin*** for the username and **hamlet** for password.
3. If you are happy with these settings, click ***Apply***. You will see following page that the new user has been displayed on the Currently Defined Users. You need to login to the web pages using your new username and new password.

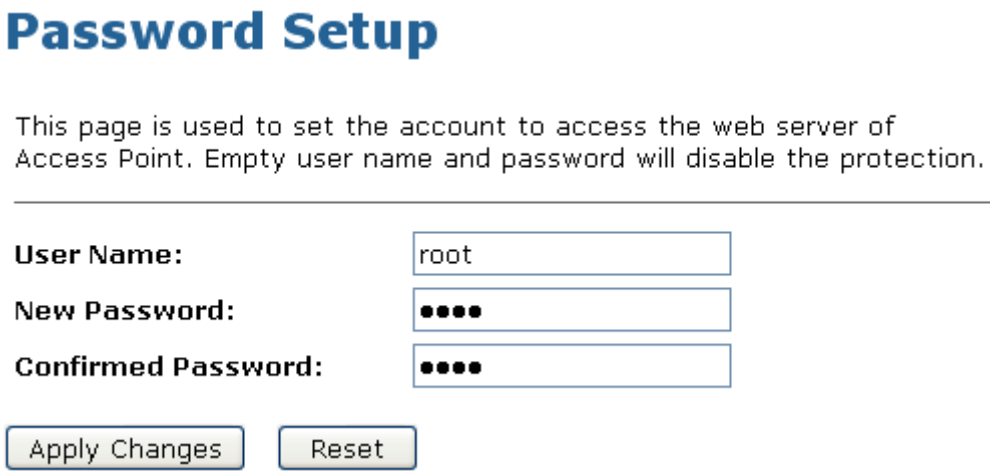
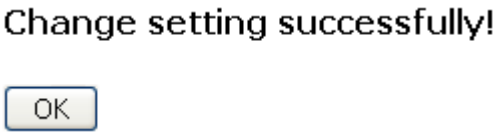


Figure 8: Administration Password

4. Click *OK*.



5. Enter new *User name* and *Password*.
6. Click *Apply*.

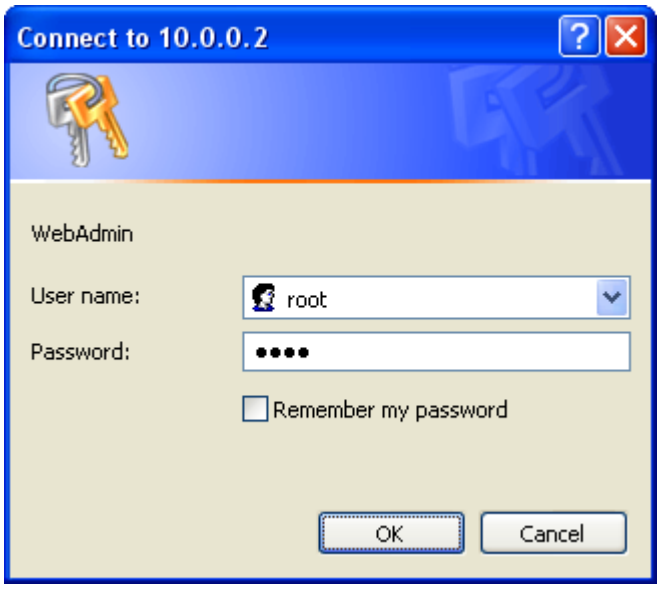


Figure 9: Login page

30. Logout

To logout:

1. From the left-hand menu, click on *Logout*. The following page is displayed:
2. Click *Apply Change*.

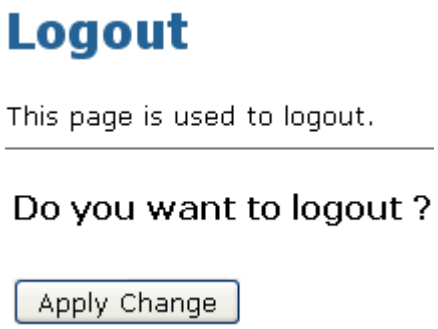


Figure 10: Logout page

A Configuring your Computers

This appendix provides instructions for configuring the Internet settings on your computers to work with the Wireless Gateway.

Configuring Ethernet PCs

Before you begin

By default, the Wireless Gateway automatically assigns the required Internet settings to your PCs. You need to configure the PCs to accept this information when it is assigned.

***Note**: In some cases, you may want to assign Internet information manually to some or all of your computers rather than allow the Wireless Gateway to do so. See* Assigning static Internet information to your PCs *for instructions*

If you have connected your LAN PCs via Ethernet to the Wireless Gateway, follow the instructions that correspond to the operating system installed on your PC:

- Windows® XP PCs
- Windows 2000 PCs
- Windows Me PCs
- Windows 95, 98 PCs
- Windows NT 4.0 workstations

Windows® XP PCs

1. In the Windows task bar, click the *Start* button, and then click *Control Panel*.
2. Double-click the Network Connections icon.
3. In the *LAN or High-Speed Internet* window, right-click on the icon corresponding to your network interface card (NIC) and select *Properties*. (Often, this icon is labeled *Local Area Connection*).
4. The *Local Area Connection* dialog box is displayed with a list of currently installed network items.
5. Ensure that the check box to the left of the item labeled *Internet Protocol TCP/IP* is checked and click *Properties*.
6. In the *Internet Protocol (TCP/IP) Properties* dialog box, click the radio button labeled *Obtain an IP address automatically*. Also click the radio button labeled *Obtain DNS server address automatically*.
7. Click *OK* twice to confirm your changes, and then close the Control Panel.

B IP Addresses, Network Masks, and Subnets

IP Addresses

***Note**: This section refers only to IP addresses for IPv4 (version 4 of the Internet Protocol). IPv6 addresses are not covered.*

This section assumes basic knowledge of binary numbers, bits, and bytes

IP addresses, the Internet's version of telephone numbers, are used to identify individual nodes (computers or devices) on the Internet. Every IP address contains four numbers, each from 0 to 255 and separated by dots (periods), e.g. 20.56.0.211. These numbers are called, from left to right, field1, field2, field3, and field4.

This style of writing IP addresses as decimal numbers separated by dots is called *dotted decimal notation*. The IP address 20.56.0.211 is read "twenty dot fifty-six dot zero dot two-eleven."

Structure of an IP address

IP addresses have a hierarchical design similar to that of telephone numbers. For example, a 7-digit telephone number starts with a 3-digit prefix that identifies a group of thousands of telephone lines, and ends with four digits that identify one specific line in that group.

Similarly, IP addresses contain two kinds of information:

- *Network ID*
  Identifies a particular network within the Internet or intranet
- *Host ID*
  Identifies a particular computer or device on the network

The first part of every IP address contains the network ID, and the rest of the address contains the host ID. The length of the network ID depends on the network's *class* (see following section). The table below shows the structure of an IP address.

	Field1	Field2	Field3	Field4
Class A	Network ID	Host ID		
Class B	Network ID		Host ID	
Class C	Network ID			Host ID

Here are some examples of valid IP addresses:

Class A: 10.30.6.125 (network = 10, host = 30.6.125)
Class B: 129.88.16.49 (network = 129.88, host = 16.49)
Class C: 192.60.201.11 (network = 192.60.201, host = 11)

Network classes

The three commonly used network classes are A, B, and C. (There is also a class D but it has a special use beyond the scope of this discussion.) These classes have different uses and characteristics.

Class A networks are the Internet's largest networks, each with room for over 16 million hosts. Up to 126 of these huge networks can exist, for a total of over 2 billion hosts. Because of their huge size, these networks are used for WANs and by organizations at the infrastructure level of the Internet, such as your ISP.

Class B networks are smaller but still quite large, each able to hold over 65,000 hosts. There can be up to 16,384 class B networks in existence. A class B network might be appropriate for a large organization such as a business or government agency.

Class C networks are the smallest, only able to hold 254 hosts at most, but the total possible number of class C networks exceeds 2 million (2,097,152 to be exact). LANs connected to the Internet are usually class C networks.

Some important notes regarding IP addresses:

- The class can be determined easily from field1:
  field1 = 1-126: Class A
  field1 = 128-191: Class B
  field1 = 192-223: Class C
  (field1 values not shown are reserved for special uses)
- A host ID can have any value except all fields set to 0 or all fields set to 255, as those values are reserved for special uses.

Subnet masks

***Definition**: A mask looks like a regular IP address, but contains a pattern of bits that tells what parts of an IP address are the network ID and what parts are the host ID: bits set to 1 mean "this bit is part of the network ID" and bits set to 0 mean "this bit is part of the host ID*

Subnet masks are used to define *subnets* (what you get after dividing a network into smaller pieces). A subnet's network ID is created by "borrowing" one or more bits from the host ID portion of the address. The subnet mask identifies these host ID bits.

For example, consider a class C network 192.168.1. To split this into two subnets, you would use the subnet mask:

255.255.255.128

It's easier to see what's happening if we write this in binary:

11111111. 11111111. 11111111.10000000

As with any class C address, all of the bits in field1 through field3 are part of the network ID, but note how the mask specifies that the first bit in field4 is also included. Since this extra bit has only two values (0 and 1), this means there are two subnets. Each subnet uses the remaining 7 bits in field4 for its host IDs, which range from 1 to 126 hosts (instead of the usual 0 to 255 for a class C address).

Similarly, to split a class C network into four subnets, the mask is:

255.255.255.192 or 11111111. 11111111. 11111111.11000000

The two extra bits in field4 can have four values (00, 01, 10, 11), so there are four subnets. Each subnet uses the remaining six bits in field4 for its host IDs, ranging from 1 to 62.

***Note**: Sometimes a subnet mask does not specify any additional network ID bits, and thus no subnets. Such a mask is called a default subnet mask. These masks are:*

Class A: 255.0.0.0
Class B: 255.255.0.0
Class C: 255.255.255.0

These are called default because they are used when a network is initially configured, at which time it has no subnets

C UPnP Control Point Software on Windows XP

This appendix provides instructions for configuring the UPnP on your computers to work with the Wireless Gateway.

UPnP is an architecture for pervasive peer-to-peer network connectivity of intelligent appliances, Wireless devices, and PCs of all form factors. It is designed to bring easy-to-use, flexible, standards-based connectivity to ad-hoc or unmanaged networks whether in the home, in a small business, public spaces, or attached to the Internet. UPnP is a distributed, open networking architecture that leverages TCP/IP and the Web technologies to enable seamless proximity networking in addition to control and data transfer among networked devices in the home, office, and public spaces.

UPnP is more than just a simple extension of the plug and play peripheral model. It is designed to support zero-configuration, "invisible" networking, and automatic discovery for a breadth of device categories from a wide range of vendors. This means a device can dynamically join a network, obtain an IP address, convey its capabilities, and learn about the presence and capabilities of other devices. DHCP and DNS servers are optional and are used only if available on the network. Finally, a device can leave a network smoothly and automatically without leaving any unwanted state behind.

UPnP Control Point Software on Windows XP with Firewall

On Windows XP versions earlier than SP2, Firewall support is provided by the Windows XP Internet Connection Firewall. You cannot use the Windows XP Internet Connection Firewall support on a system that you intend to use as a UPnP control point. If this feature is enabled, although the control point system may display controlled devices in the list of network devices, the control point system cannot participate in UPnP communication. (This restriction also applies to controlled devices running on Windows XP systems earlier than SP2.)

On Windows XP SP2 and later, Firewall support is provided by Windows Firewall. Unlike earlier versions, Windows XP SP2 can be used on a system that you intend to use as a UPnP control point.

To turn off the Firewall capability on any version of Windows XP, follow the steps below:

1. In the “Control Panel”, select "Network and Internet Connections".

2. In the "Network and Internet Connections" dialog box, select "Network Connections".

3. In the "Network Connections" dialog box, right-click on the local area connection entry for your network; this will display a menu. Select the "Properties" menu entry.

4. In the "Local Area Connection Properties" dialog box, select the "Advanced" tab. Disable the Internet Connection Firewall by de-selecting the entry with the following label:

"Protect my computer and network by limiting or preventing access to the computer from the Internet".

5. Click "OK".

SSDP requirements

You must have SSDP Discovery Service enabled on your Windows XP system to use the UPnP Control point software.

SSDP Discovery Service is enabled on a default installation of Windows XP. To check if it is enabled on your system, look in Control Panel > Administrative Tools > Services).

Installation procedure

To install the Control point software on Windows XP, follow the steps below:

1. In the “Control Panel”, select "Add/Remove Programs".

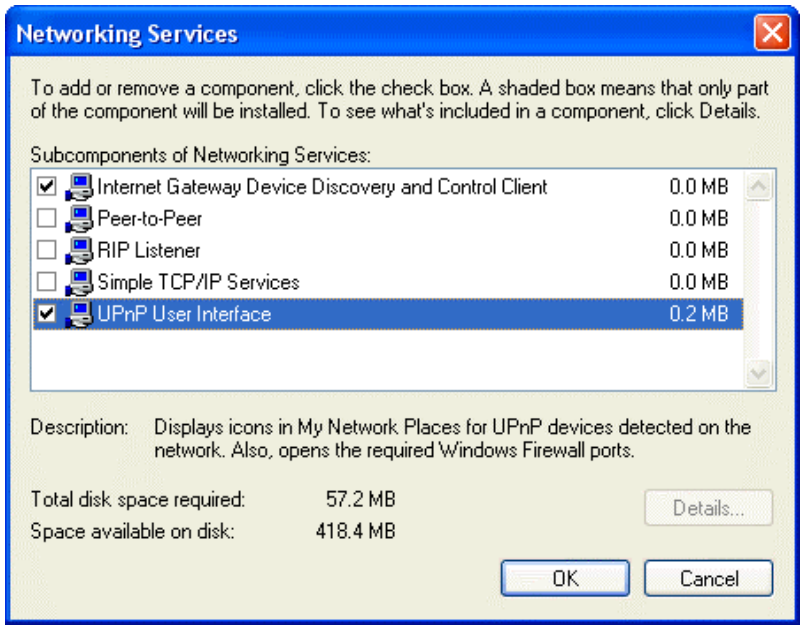
2. In the "Add or Remove Programs" dialog box, click the "Add / Remove Windows Components" button.

3. In the "Windows Component Wizard" dialog box, scroll down the list to display the "Networking Services" entry. Highlight (select) the entry, and click on the "Details" button.

4. The “Networking Services” window is displayed.

The subcomponents shown in the Networking Services window will be different depending on if you are using Windows XP, Windows XP (SP1), or Windows XP (SP2).

If you are using Windows XP SP2, the Networking Services window will display the following list of sub-components:



5. Select the following entries from the “Networking Services” window and then click "OK":

If you are using **Windows XP**, select:

- "Universal Plug and Play".

If you are using **Windows XP SP1**, select:

- "Internet Gateway Device discovery and Control Client".
- "Universal Plug and Play".

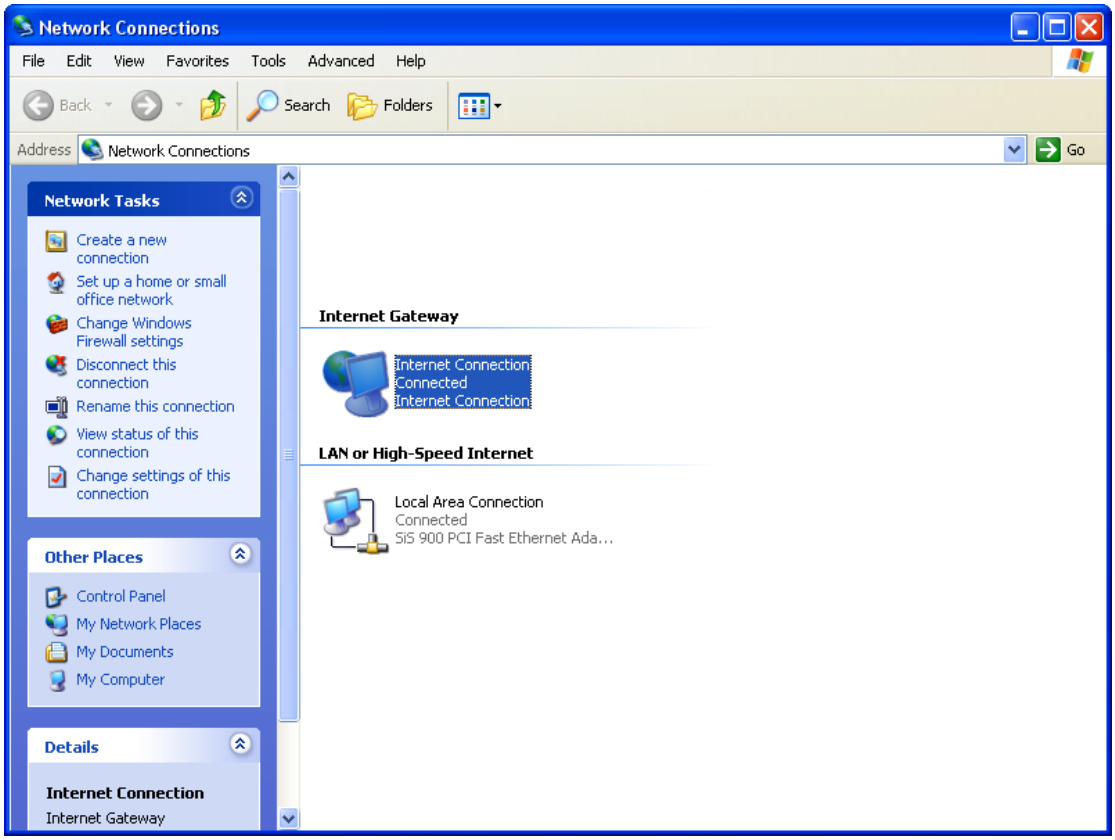
If you are using **Windows XP SP2**, select:

- "Internet Gateway Device discovery and Control Client".
- "UPnP User Interface".

6. Reboot your system.

Once you have installed the UPnP software and you have rebooted (and your network includes the IGD system), you should be able to see the IGD controlled device on your network.

For example, from the Network Connections window you should see the Internet Gateway Device:


Network Connections
File Edit View Favorites Tools Advanced Help
Back Search Folders
Address Network Connections
Go
Network Tasks
Create a new connection
Set up a home or small office network
Change Windows Firewall settings
Disconnect this connection
Rename this connection
View status of this connection
Change settings of this connection
Other Places
Control Panel
My Network Places
My Documents
My Computer
Details
Internet Connection
Internet Gateway
Internet Gateway
Internet Connection
Connected
Internet Connection
LAN or High-Speed Internet
Local Area Connection
Connected
SiS 900 PCI Fast Ethernet Ada...

D Troubleshooting

This appendix suggests solutions for problems you may encounter in installing or using the Wireless Gateway, and provides instructions for using several IP utilities to diagnose problems.

Contact Customer Support if these suggestions do not resolve the problem.

Troubleshooting Suggestions

Problem	Troubleshooting Suggestion
LEDs	
Power LED does not illuminate after product is turned on.	Verify that you are using the power cable provided with the device and that it is securely connected to the Wireless Gateway and a wall socket/power strip.
LINK LAN LED does not illuminate after Ethernet cable is attached.	Verify that the Ethernet cable is securely connected to your LAN hub or PC and to the Wireless Gateway. Make sure the PC and/or hub is turned on. Verify that your cable is sufficient for your network requirements. A 100 Mbit/sec network (10BaseTx) should use cables labeled CAT 5. A 10Mbit/sec network may tolerate lower quality cables.
Internet Access	
My PC cannot access the Internet	Use the ping utility (discussed in the following section) to check whether your PC can communicate with the device's LAN IP address (by default 192.168.1.254). If it cannot, check the Ethernet cabling. If you statically assigned a private IP address to the computer, (not a registered public address), verify the following: • Check that the gateway IP address on the computer is your public IP address (see Current Status for instructions on viewing the IP information.) If it is not, correct the address or configure the PC to receive IP information automatically. • Verify with your ISP that the DNS server specified for the PC is valid. Correct the address or configure the PC to receive this information automatically.
My LAN PCs cannot display web pages on the Internet.	Verify that the DNS server IP address specified on the PCs is correct for your ISP, as discussed in the item above. If you specified that the DNS server be assigned dynamically from a server, then verify with your ISP that the address configured on the Wireless Gateway is correct, then You can use the ping utility, to test connectivity with your ISP's DNS server.
Web pages	
I forgot/lost my user ID or password.	If you have not changed the password from the default, try using "admin" the user ID and "hamlet" as password. Otherwise, you can reset the device to the default configuration by pressing the Reset Default button on the Rare panel of the device (see *Rare Panel*). Then, type the default User ID and password shown above. **WARNING:** Resetting the device removes any custom settings and returns all settings to their default values.
I cannot access the web pages from my browser.	Use the ping utility, discussed in the following section, to check whether your PC can communicate with the device's LAN IP address (by default 192.168.1.254). If it cannot, check the Ethernet cabling. Verify that you are using Internet Explorer or Netscape Navigator v4.0 or later. Verify that the PC's IP address is defined as being on the same subnet as the IP address assigned to the LAN port on the Wireless Gateway.
My changes to the web pages are not being retained.	Be sure to use the *Confirm Changes/Apply* function after any changes.

Diagnosing Problem using IP Utilities

ping

Ping is a command you can use to check whether your PC can recognize other computers on your network and the Internet. A ping command sends a message to the computer you specify. If the computer receives the message, it sends messages in reply. To use it, you must know the IP address of the computer with which you are trying to communicate.

On Windows-based computers, you can execute a ping command from the Start menu. Click the *Start* button, and then click *Run*. In the *Open* text box, type a statement such as the following:

ping 192.168.1.254

Click *OK*. You can substitute any private IP address on your LAN or a public IP address for an Internet site, if known.

If the target computer receives the message, a *Command Prompt* window is displayed:

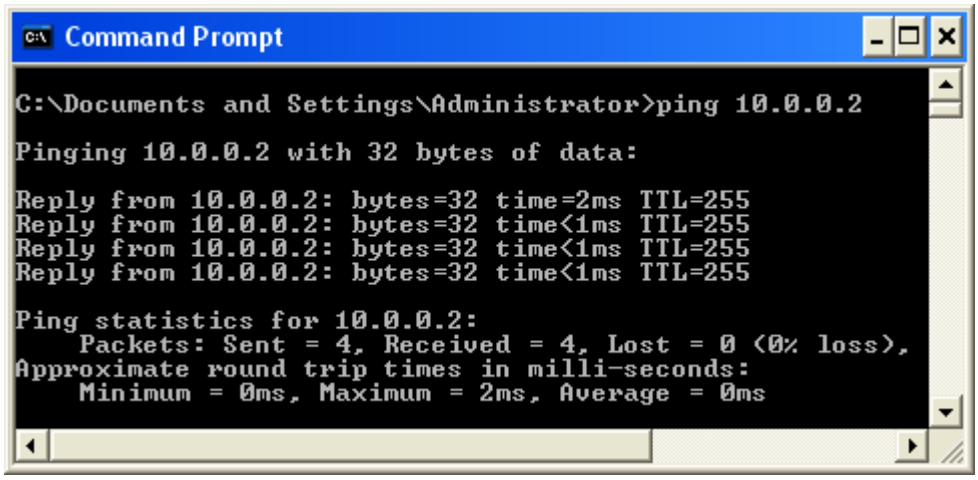


Figure 11: Using the ping Utility

If the target computer cannot be located, you will receive the message *Request timed out*.

Using the ping command, you can test whether the path to the Wireless Gateway is working (using the preconfigured default LAN IP address 192.168.1.254) or another address you assigned.

You can also test whether access to the Internet is working by typing an external address, such as that for *www.yahoo.com* (216.115.108.243). If you do not know the IP address of a particular Internet location, you can use the *nslookup* command, as explained in the following section.

From most other IP-enabled operating systems, you can execute the same command at a command prompt or through a system administration utility.

nslookup

You can use the nslookup command to determine the IP address associated with an Internet site name. You specify the common name, and the nslookup command looks up the name in on your DNS server (usually located with your ISP). If that name is not an entry in your ISP's DNS table, the request is then referred to another higher-level server, and so on, until the entry is found. The server then returns the associated IP address.

On Windows-based computers, you can execute the nslookup command from the *Start* menu. Click the *Start* button, and then click *Run*. In the *Open* text box, type the following:

nslookup

Click *OK*. A Command Prompt window displays with a bracket prompt (>). At the prompt, type the name of the Internet address that you are interested in, such as *www.microsoft.com*.

The window will display the associate IP address, if known, as shown below:

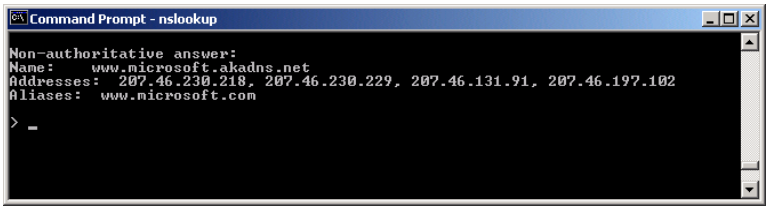


Figure 12: Using the nslookup Utility

There may be several addresses associated with an Internet name. This is common for web sites that receive heavy traffic; they use multiple, redundant servers to carry the same information.

To exit from the nslookup utility, type **exit** and press **[Enter]** at the command prompt.

E Glossary

10BASE-T A designation for the type of wiring used by Ethernet networks with a data rate of 10 Mbps. Also known as Category 3 (CAT 3) wiring. See *data rate, Ethernet*.

100BASE-T A designation for the type of wiring used by Ethernet networks with a data rate of 100 Mbps. Also known as Category 5 (CAT 5) wiring. See *data rate, Ethernet*.

ADSL Asymmetric Digital Subscriber Line
The most commonly deployed "flavor" of DSL for home users is asymmetrical DSL. The term asymmetrical refers to its unequal data rates for downloading and uploading (the download rate is higher than the upload rate). The asymmetrical rates benefit home users because they typically download much more data from the Internet than they upload.

analog An analog signal is a signal that has had its frequency modified in some way, such as by amplifying its strength or varying its frequency, in order to add information to the signal. The voice component in DSL is an analog signal. See *digital*.

ATM Asynchronous Transfer Mode
A standard for high-speed transmission of data, text, voice, and video, widely used within the Internet. ATM data rates range from 45 Mbps to 2.5 Gbps. See *data rate*.

authenticate To verify a user's identity, such as by prompting for a password.

binary The "base two" system of numbers, that uses only two digits, 0 and 1, to represent all numbers. In binary, the number 1 is written as 1, 2 as 10, 3 as 11, 4 as 100, etc. Although expressed as decimal numbers for convenience, IP addresses in actual use are binary numbers; e.g., the IP address 209.191.4.240 is 11010001.10111111.00000100.11110000 in binary. See *bit, IP address, network mask*.

bit Short for "binary digit," a bit is a number that can have two values, 0 or 1. See *binary*.

bps bits per second

bridging Passing data from your network to your ISP and vice versa using the hardware addresses of the devices at each location. Bridging contrasts with routing, which can add more intelligence to data transfers by using network addresses instead. The Wireless Gateway can perform both routing and bridging. Typically, when both functions are enabled, the device routes IP data and bridges all other types of data. See *routing*.

broadband A telecommunications technology that can send different types of data over the same medium. DSL is a broadband technology.

broadcast To send data to all computers on a network.

DHCP Dynamic Host Configuration Protocol
DHCP automates address assignment and management. When a computer connects to the LAN, DHCP assigns it an IP address from a shared pool of IP addresses; after a specified time limit, DHCP returns the address to the pool.

DHCP relay Dynamic Host Configuration Protocol relay
A DHCP relay is a computer that forwards DHCP data between

	computers that request IP addresses and the DHCP server that assigns the addresses. Each of the Wireless Gateway's interfaces can be configured as a DHCP relay. See *DHCP*.
DHCP server	Dynamic Host Configuration Protocol server A DHCP server is a computer that is responsible for assigning IP addresses to the computers on a LAN. See *DHCP*.
digital	Of data, having a form based on discrete values expressed as binary numbers (0's and 1's). The data component in DSL is a digital signal. See *analog*.
DNS	Domain Name System The DNS maps domain names into IP addresses. DNS information is distributed hierarchically throughout the Internet among computers called DNS servers. For example, *www.yahoo.com* is the domain name associated with IP address 216.115.108.243. When you start to access a web site, a DNS server looks up the requested domain name to find its corresponding IP address. If the DNS server cannot find the IP address, it communicates with higher-level DNS servers to determine the IP address. See *domain name.*
domain name	A domain name is a user-friendly name used in place of its associated IP address. Domain names must be unique; their assignment is controlled by the Internet Corporation for Assigned Names and Numbers (ICANN). Domain names are a key element of URLs, which identify a specific file at a web site. See *DNS.*
download	To transfer data in the downstream direction, i.e., from the Internet to the user.
DSL	Digital Subscriber Line A technology that allows both digital data and analog voice signals to travel over existing copper telephone lines.
encryption keys	See *network keys*
Ethernet	The most commonly installed computer network technology, usually using twisted pair wiring. Ethernet data rates are 10 Mbps and 100 Mbps. *See also 10BASE-T, 100BASE-T, twisted pair*.
FTP	File Transfer Protocol A program used to transfer files between computers connected to the Internet. Common uses include uploading new or updated files to a web server, and downloading files from a web server.
Gbps	Abbreviation of Gigabits per second, or one billion bits per second. Internet data rates are often expressed in Gbps.
host	A device (usually a computer) connected to a network.
HTTP	Hyper-Text Transfer Protocol HTTP is the main protocol used to transfer data from web sites so that it can be displayed by web browsers. See *web browser, web site*.
Hub	A hub is a place of convergence where data arrives from one or more directions and is forwarded out in one or more directions. It connects an Ethernet bridge/router to a group of PCs on a LAN and allows communication to pass between the networked devices.
ICMP	Internet Control Message Protocol An Internet protocol used to report errors and other network-related information. The ping command makes use of ICMP.
IEEE	The Institute of Electrical and Electronics Engineers is a technical professional society that fosters the development of standards that often become national and international standards.

Internet	The global collection of interconnected networks used for both private and business communications.
intranet	A private, company-internal network that looks like part of the Internet (users access information using web browsers), but is accessible only by employees.
IP	*See TCP/IP*.
IP address	Internet Protocol address The address of a host (computer) on the Internet, consisting of four numbers, each from 0 to 255, separated by periods, e.g., 209.191.4.240. An IP address consists of a *network ID* that identifies the particular network the host belongs to, and a *host ID* uniquely identifying the host itself on that network. A network mask is used to define the network ID and the host ID. Because IP addresses are difficult to remember, they usually have an associated domain name that can be specified instead. See *domain name, network mask*.
ISP	Internet Service Provider A company that provides Internet access to its customers, usually for a fee.
LAN	Local Area Network A network limited to a small geographic area, such as a home or small office.
LED	Light Emitting Diode An electronic light-emitting device. The indicator lights on the front of the Wireless Gateway are LEDs.
MAC address	Media Access Control address The permanent hardware address of a device, assigned by its manufacturer. MAC addresses are expressed as six pairs of hex characters, with each pair separated by colons. For example; *NN:NN:NN:NN:NN:NN*.
mask	*See network mask*.
Mbps	Abbreviation for Megabits per second, or one million bits per second. Network data rates are often expressed in Mbps.
NAT	Network Address Translation A service performed by many routers that translates your network's publicly known IP address into a *private* IP address for each computer on your LAN. Only your router and your LAN know these addresses; the outside world sees only the public IP address when talking to a computer on your LAN.
network	A group of computers that are connected together, allowing them to communicate with each other and share resources, such as software, files, etc. A network can be small, such as a *LAN*, or very large, such as the *Internet*.
network mask	A network mask is a sequence of bits applied to an IP address to select the network ID while ignoring the host ID. Bits set to 1 mean "select this bit" while bits set to 0 mean "ignore this bit." For example, if the network mask 255.255.255.0 is applied to the IP address 100.10.50.1, the network ID is 100.10.50, and the host ID is 1. See *binary, IP address, subnet*.
NIC	Network Interface Card An adapter card that plugs into your computer and provides the physical interface to your network cabling. For Ethernet NICs this is typically an RJ-45 connector. See *Ethernet, RJ-45*.
packet	Data transmitted on a network consists of units called packets. Each packet contains a payload (the data), plus overhead information such

	as where it came from (source address) and where it should go (destination address).
ping	Packet Internet (or Inter-Network) Groper A program used to verify whether the host associated with an IP address is online. It can also be used to reveal the IP address for a given domain name.
port	A physical access point to a device such as a computer or router, through which data flows into and out of the device.
PPP	Point-to-Point Protocol A protocol for serial data transmission that is used to carry IP (and other protocol) data between your ISP and your computer. The WAN interface on the Wireless Gateway uses two forms of PPP called PPPoA and PPPoE. See *PPPoA, PPPoE*.
PPPoA	Point-to-Point Protocol over ATM One of the two types of PPP interfaces you can define for a Virtual Circuit (VC), the other type being PPPoE. You can define only one PPPoA interface per VC.
PPPoE	Point-to-Point Protocol over Ethernet One of the two types of PPP interfaces you can define for a Virtual Circuit (VC), the other type being PPPoA. You can define one or more PPPoE interfaces per VC.
protocol	A set of rules governing the transmission of data. In order for a data transmission to work, both ends of the connection have to follow the rules of the protocol.
remote	In a physically separate location. For example, an employee away on travel who logs in to the company's intranet is a remote user.
RIP	Routing Information Protocol The original TCP/IP routing protocol. There are two versions of RIP: version I and version II.
RJ-11	Registered Jack Standard-11 The standard plug used to connect telephones, fax machines, modems, etc. to a telephone port. It is a 6-pin connector usually containing four wires.
RJ-45	Registered Jack Standard-45 The 8-pin plug used in transmitting data over phone lines. Ethernet cabling usually uses this type of connector.
routing	Forwarding data between your network and the Internet on the most efficient route, based on the data's destination IP address and current network conditions. A device that performs routing is called a router.
SDNS	Secondary Domain Name System (server) A DNS server that can be used if the primary DSN server is not available. *See DNS*.
subnet	A subnet is a portion of a network. The subnet is distinguished from the larger network by a *subnet mask* that selects some of the computers of the network and excludes all others. The subnet's computers remain physically connected to the rest of the parent network, but they are treated as though they were on a separate network. See *network mask*.
subnet mask	A mask that defines a subnet. See *network mask*.
TCP	See *TCP/IP*.

TCP/IP	Transmission Control Protocol/Internet Protocol The basic protocols used on the Internet. TCP is responsible for dividing data up into packets for delivery and reassembling them at the destination, while IP is responsible for delivering the packets from source to destination. When TCP and IP are bundled with higher-level applications such as HTTP, FTP, Telnet, etc., TCP/IP refers to this whole suite of protocols.
Telnet	An interactive, character-based program used to access a remote computer. While HTTP (the web protocol) and FTP only allow you to download files from a remote computer, Telnet allows you to log into and use a computer from a remote location.
TFTP	Trivial File Transfer Protocol A protocol for file transfers, TFTP is easier to use than File Transfer Protocol (FTP) but not as capable or secure.
TKIP	Temporal Key Integrity Protocol (TKIP) provides WPA with a data encryption function. It ensures that a unique master key is generated for each packet, supports message integrity and sequencing rules and supports re-keying mechanisms.
triggers	Triggers are used to deal with application protocols that create separate sessions. Some applications, such as NetMeeting, open secondary connections during normal operations, for example, a connection to a server is established using one port, but data transfers are performed on a separate connection. A trigger tells the device to expect these secondary sessions and how to handle them. Once you set a trigger, the embedded IP address of each incoming packet is replaced by the correct host address so that NAT can translate packets to the correct destination. You can specify whether you want to carry out address replacement, and if so, whether to replace addresses on TCP packets only, UDP packets only, or both.
twisted pair	The ordinary copper telephone wiring used by telephone companies. It contains one or more wire pairs twisted together to reduce inductance and noise. Each telephone line uses one pair. In homes, it is most often installed with two pairs. For Ethernet LANs, a higher grade called Category 3 (CAT 3) is used for 10BASE-T networks, and an even higher grade called Category 5 (CAT 5) is used for 100BASE-T networks. See *10BASE-T, 100BASE-T, Ethernet*.
unnumbered interfaces	An unnumbered interface is an IP interface that does not have a local subnet associated with it. Instead, it uses a *router-id* that serves as the source and destination address of packets sent to and from the router. Unlike the IP address of a normal interface, the router-id of an unnumbered interface is allowed to be the same as the IP address of another interface. For example, the WAN unnumbered interface of your device uses the same IP address of the LAN interface (192.168.1.254). The unnumbered interface is temporary – PPP or DHCP will assign a 'real' IP address automatically.
upstream	The direction of data transmission from the user to the Internet.
VC	Virtual Circuit A connection from your DSL router to your ISP.
VCI	Virtual Circuit Identifier Together with the Virtual Path Identifier (VPI), the VCI uniquely identifies a VC. Your ISP will tell you the VCI for each VC they provide. See *VC*.
VPI	Virtual Path Identifier Together with the Virtual Circuit Identifier (VCI), the VPI uniquely

	identifies a VC. Your ISP will tell you the VPI for each VC they provide. See *VC*.
WAN	Wide Area Network Any network spread over a large geographical area, such as a country or continent. With respect to the Wireless Gateway, WAN refers to the Internet.
Web browser	A software program that uses Hyper-Text Transfer Protocol (HTTP) to download information from (and upload to) web sites, and displays the information, which may consist of text, graphic images, audio, or video, to the user. Web browsers use Hyper-Text Transfer Protocol (HTTP). Popular web browsers include Netscape Navigator and Microsoft Internet Explorer. See *HTTP, web site, WWW*.
Web page	A web site file typically containing text, graphics and hyperlinks (cross-references) to the other pages on that web site, as well as to pages on other web sites. When a user accesses a web site, the first page that is displayed is called the *home page*. See *hyperlink, web site*.
Web site	A computer on the Internet that distributes information to (and gets information from) remote users through web browsers. A web site typically consists of web pages that contain text, graphics, and hyperlinks. See *hyperlink, web page*.
WWW	World Wide Web Also called *(the) Web.* Collective term for all web sites anywhere in the world that can be accessed via the Internet.

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